OEM Xchange™ Secondary Mount
User Manual

Version 1.72 **29 May 2014**

Revision	Date of Revision	Changes	Name
1.6	06 Feb 2013	Added NMEA-like output	Dustin Olender
1.7	19 June 2013	Updated current consumption	Dustin Olender
1.71	07 Oct 2013	Corr'd NMEA; Added change units commands	Dustin Olender
1.72	29 May 2014	Edited page number references	Jehan Zouak

Table of Contents

General Description of the Instrument 2
Shipping & Receiving 4
Receiving an Instrument 4
Returning an Instrument to the Factory 5
Using the Instrument 6
Installation 6
Pressure Ratings 6
Pre-Deployment Procedures 6
Configuring Sampling Parameters using SeaCast 7
Selecting an instrument for configuration 7
Configuring the selected instrument 8
Instrument time, memory & log file settings 9
Configuring Sampling Parameters with HyperTerminal 9
Monitoring Real Time Data 11
Post-Deployment Procedures 11
Configuring the Instrument for Data on Power Up 12
Disabling Data on Power Up 12
Maintaining the Instrument 13
Periodic Maintenance 13
Communications 14
PC Settings 14
Output Formats 14
Default output format 14
Example outputs: 15
NMEA-like output format 16
Customer Support 18
Troubleshooting 18
AML Oceanographic Contact Info 19
Appendices 20
Commands 20
Communications commands 20
Sampling rate commands 21
Output format commands 21
General commands 21
Technical Specifications 23
Warranty 26
OEM Xchange™ Secondary Overview Drawings 27

General Description of the Instrument

The AML Oceanographic X series instruments and sensors provide a major advancement in ocean instrumentation. The swappable and interchangeable sensor technologies dramatically improve the capabilities of ocean instrumentation. These capabilities include:

- Changing the instrument sensor types, while at sea, within seconds, and without tools. For example the same instrument can be changed from a CTD to a sound speed profiler.
- The sensor ranges can be swapped as sampling conditions change to maximize the instrument's resolution and accuracy. For example, a deep pressure sensor can be swapped for a shallow pressure sensor, and the salt water conductivity sensor can be swapped for a fresh water conductivity sensor.
- Sensors from one instrument can be swapped to another instrument to maintain mission critical capabilities.
- Calibrated sensors can be sent to the instrument so that the instrument does not need to be removed from service for calibration.
- Spare sensors ensure that an instrument can be immediately returned to service after catastrophic damage, such as a high speed impact with the ship's hull.
- All calibration and traceability data resides within each sensor. There is no need update instrument configuration files or coefficients. Calibration data for all sensors is instantly available from the instrument, and calibration certificates can be printed from AML Oceanographic's SeaCast software whenever the instrument is connected.
- Logged data is stamped with sensor traceability and instrument configuration data. So there is never a doubt about how the data was collected or the status of the sensor's calibration.
- Since only the sensors need to be returned for recalibration the shipping costs are dramatically reduced.

The OEM Xchange™ Secondary Mount is the miniature, single-sensor, member of the X•Series family. It is externally powered and provides the data via cable. Communications with the OEM Xchange™ Secondary Mount are accomplished with RS-232,RS-485 or TTL, depending on what is ordered from the factory. Sampling rates are programmable by time (25 Hz to every 24 hours).

The OEM Xchange™ Secondary Mount is equipped with only one Xchange™ sensor port. Due to the interchangeability of Xchange™, any of the following sensors may be used with the secondary port (S1); temperature, pressure, and turbidity.

An OEM Xchange™ Secondary Mount with a secondary Xchange™ sensor port cannot accept Xchange™ sensors designed for a primary port, and vice versa. For information on the use of sound velocity and conductivity sensors, please refer to the OEM Xchange™ Primary Mount User Manual.

Which Manual Do I Start With?

AML Oceanographic's Xchange™ instruments are shipped with several manuals on the CD:

- An instrument manual (ie. This OEM Xchange™ Secondary Mount manual) which provides an overview on how to use and maintain the instrument;
- A software manual (ie. SeaCast) which provides instructions on how to use the software to configure the instrument and review instrument data;
- Xchange™ sensor manuals (T•Xchange™, P•Xchange™, Turbidity•Xchange™) and which provide overviews on how to install and maintain each of the Xchange™ sensors.

If you are configuring a sensor for field use or lab test, we recommend that you begin with the software (SeaCast) manual.

If you are focused on instrument maintenance, we recommend that you begin with the instrument manual.

If you are wishing to swap an Xchange™ sensor, we recommend that you read the appropriate Xchange™ manual.

Shipping & Receiving

Receiving an Instrument

When an instrument is received at a new location it is prudent to perform the following steps to ensure the instrument is capable of performing when required.

- Check the shipping container for signs of damage. This could indicate damage to the instrument inside.
- The shipping package should include all of the following items
    - Electronics board set (2 circuit boards if RS-232 or RS-485 and 1 for TTL)
    - One sensor bulkhead connector
    - One sensor port blanking plug
    - CD with manuals and documentation
- Check for damage
    - Check the connector sockets for corrosion, dirt and salt deposits
    - Check the circuit boards for damage
- Check the Xchange™ sensor is installed tightly. The blue retaining ring should be within 1 mm of the instrument end cap.
- Connect the instrument to a computer with the data cable and perform a scan, or monitor if using SeaCast.

Returning an Instrument to the Factory

- If shipping for repair or recalibration, obtain an RMA number from the service centre.
- Pack the instrument in its original shipping box, if possible, to prevent damage during shipping

An RMA number can be requested using any of the following contact options:

Service Department:
Email: service@AMLoceanographic.com
Phone: 1-250-656-0771
Phone : 1-800-663-8721 (NA)
Fax: 1-250-655-3655

Website:
http://www.AMLoceanographic.com

Customer Portal:

RMA requests may also be submitted through ***My AML Oceanographic*** (once logged in) or by navigating to the 'Support' tab on the AML Oceanographic website.

Mailing and Shipping Address:
AML Oceanographic.
2071 Malaview Ave.
Sidney, BC, Canada
V8L 5X6

Using the Instrument

Installation

Refer to OEM specification drawings at the end of this manual for mounting details.

Pressure Ratings

Pressure ratings are given for both the P•Xchange™ and Turbidity•Xchange™ sensors and the OEM sensor bulkhead. The sensor bulkhead is rated to 6000 dBar, however it is important to know what the rating is on your sensor. **Deployments should never exceed the lower of these pressure ratings.**

Caution: Do not exceed the specified pressure ratings of the P•Xchange™ sensor, Turbidity•Xchange™ sensor or the OEM sensor bulkhead. Overpressure can result in damage to the sensors and the bulkhead. Turbidity•Xchange™ sensors are limited to deployments of 500m depth.

It is desirable to optimize the accuracy of pressure measurements by using a P•Xchange™ sensor with a pressure range that closely matches the depth of the deployment.

Pre-Deployment Procedures

- Upon Receipt
  - Use the receiving steps above to verify the instrument is in good working order.
  - Verify the calibrations of all sensors are valid for the duration of the deployment. If not, swap the Xchange™ sensors for sensors with valid calibrations or send the Xchange™ sensors to a service center for recalibration.
  - Verify that the pressure range for either the T•Xchange™, P•Xchange™, and Turbidity•Xchange™ sensor being used is appropriate for the depth of the deployment.

Caution: Install blanking plugs in all unused sensor ports prior to deployment. Failure to install blanking plugs will result in damage to the connectors.

T•Xchange™, P•Xchange™ & Turbidity•Xchange™ Blanking Plug

- The intent of an OEM product is to offer integration and flexibility for the manufacturer. Please consult AML for guidance or assistance with your specific application.
- Ensure bulkhead and electronics are secure

Configuring Sampling Parameters using SeaCast

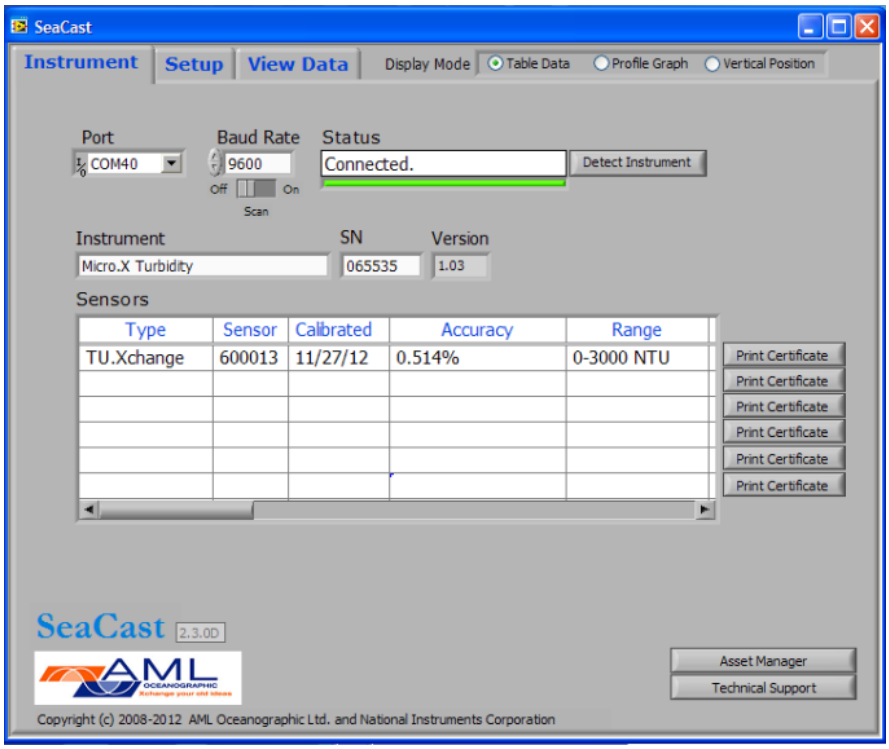
AML Oceanographic's SeaCast application software greatly simplifies the process of setting up an instrument to complete a profile.

Full details on the instrument configuration process can be found in the SeaCast manual. Below please find a quick summary of that process:

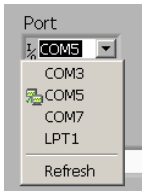
- Note that for OEM integration, SeaCast is not required. However, SeaCast offers a good overview of what is possible with the AML API. Please consult AML for more information.

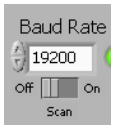
Selecting an instrument for configuration

On the Instrument Tab, the first row of fields 'Port', 'Baud Rate' and 'Status' control and display the communications with the instrument.



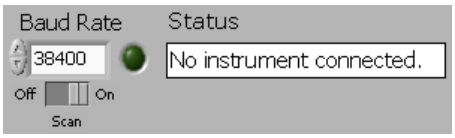
The 'Port' field allows the user to select the computer communications port to which the instrument is connected. If uncertain about the port the user can check the ports in the Device Manager or Hardware Manager found in the control panel in the Windows operating system. The 'Refresh' selection at the bottom of the list allows the user to force a new detection of available ports. This is useful if a USB connection is made after SeaCast is launched.



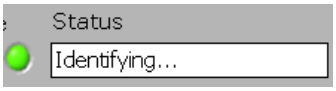


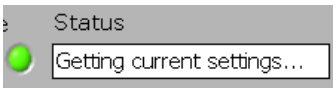
The 'Baud Rate' field is used to select the baud rate the user wishes to use while communicating to the instrument. Lower baud rates allow longer cables to be used if using RS-232/485/422. Higher baud rates shorten the data transfer times. Choose 38,400 baud rate (default) whenever possible.

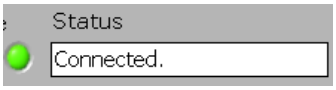
If an instrument is set to autobaud (default setting) it will detect the baud rate chosen in SeaCast and communicate at that baud rate. If the baud rate is changed in SeaCast then power to the instrument must be cycled to re-establish communications at the new baud rate.



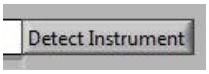
Some instruments are set up to communicate at fixed baud rates. In this case the baud rate in SeaCast must be set to the same baud rate as the instrument. If the instrument baud rate is unknown, the 'Scan' switch below the 'Baud Rate' field can be used to have SeaCast cycle through all the baud rates to try to detect the instrument baud rate.







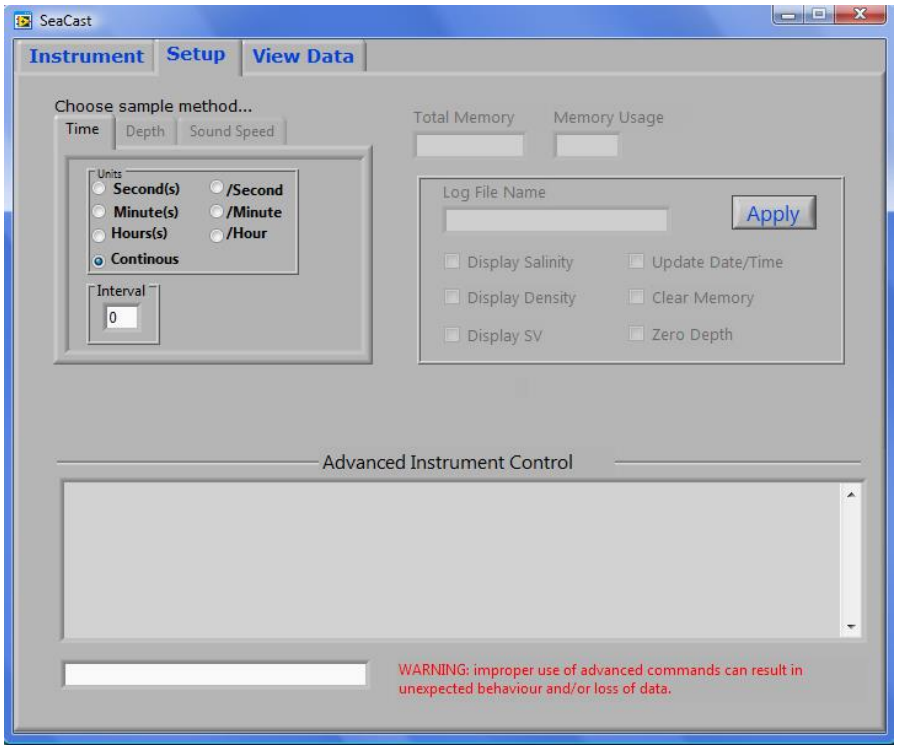
The "Status" field shows the status of the communications with the instrument. The green light indicates that communications have been established with the instrument. During the identification process, SeaCast is determining the type and serial number of the instrument and any connected sensors. During the settings process, SeaCast is determining the latest sampling and logging settings that were programmed into the instrument. When all the required handshaking has been completed, the 'Status' field will show "Connected" and the user may now use the instrument. Please note that the handshaking can take up to 30 seconds to complete.



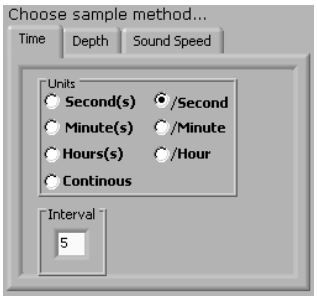
The Detect Instrument button forces SeaCast to re-detect and re-identify the instrument and its sensors.

Configuring the selected instrument

After the instrument has been detected by SeaCast, select the Setup tab at the top of the SeaCast window.



The box in the upper left of the Setup page controls the sampling of the instrument. For the OEM Xchange™ Secondary Mount only the time increment sampling method is available. I.e. sample at 25 times per second, 10 times per hour, every 5 seconds, etc. The continuous selection sets the instrument to sample as fast as possible. For the OEM Xchange™ Secondary Mount this is 25 Hz.



Sampling Method Selection Tab

Instrument time, memory & log file settings

The OEM Xchange™ Secondary Mount does not contain batteries, internal memory or a real-time clock. Therefore time stamps and data logging are not available.

Configuring Sampling Parameters with HyperTerminal

Instruments can also be configured for deployment using HyperTerminal or other terminal emulation programs. HyperTerminal will need to be used for TTL. As with SeaCast, communications with the instrument must be established using the correct communications port

and settings. The communications settings are 8 data bits, 1 stop bit, no parity, no flow control and the desired baud rate.

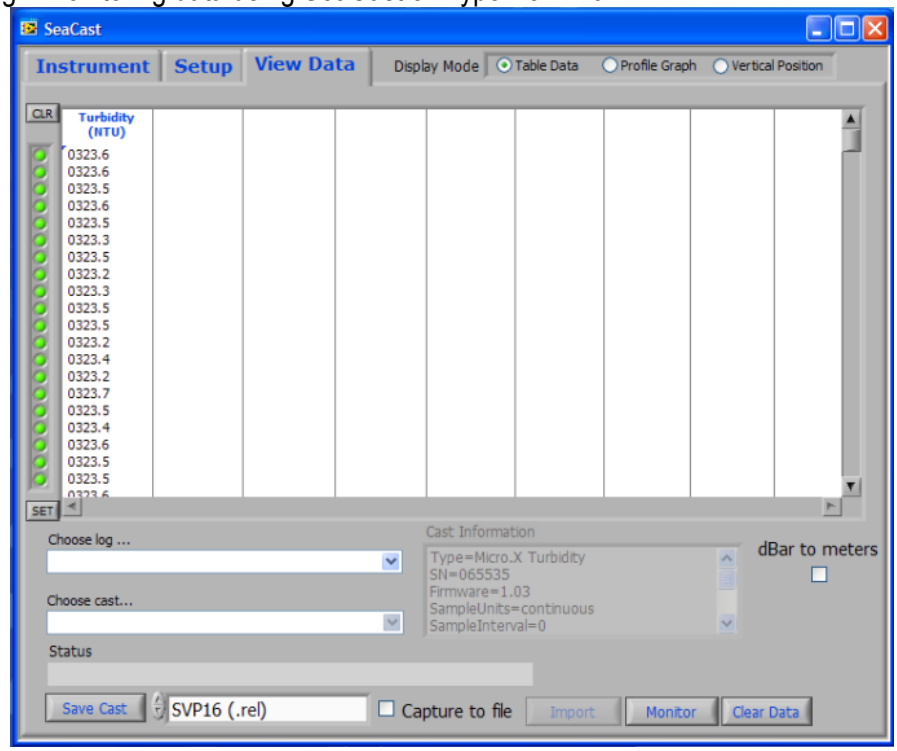
The sampling parameters can be programmed by entering text commands. The following are examples:

SET SAMPLE RATE CONTINUOUS	Sets the sample rate to as fast as possible (25 Hz)
SET SAMPLE RATE 5/s	Sets the sample rate to 5 samples per second
SET P INC 1	Sets the sample rate to pressure increments of 1 dbar
SET SOUND INC 2	Sets the sample rate to sound speed increments of 2 m/s

Please consult the Commands section of the Appendix for full syntax details on how to issue the commands in question. Please note that the above are example commands only; many additional sampling regimes can be established.

Monitoring Real Time Data

- Ensure the pre-deployment procedures have been done (see Page 6).
- Ensure that the desired sampling requirements have been selected and applied.
- Plug the data/power cable into the instrument. If you power the instrument over a long cable, please note the following:
    - The longer the cable the higher the voltage drop on the cable. The voltage drop on a standard AML cable, with a standard OEM Xchange™ Secondary Mount, is about 1 volt per 100m of cable.
    - The instrument's lowest voltage is 8 volts.
    - The instrument's maximum voltage is 16 volts.
    - The voltage at the instrument, while sampling, must be above the shutdown level for the instrument to operate.
- If using a Pressure•Xchange™ sensor, with the instrument in air, use the zero command to zero the barometric pressure offset.
- Begin monitoring data using SeaCast or HyperTerminal.



Post-Deployment Procedures

- When the instrument is pulled from the water it should be rinsed in fresh water.
- If applicable, dry the area around the connectors with a clean cloth or compressed air prior to disconnecting the plugs or cables. Do not blow compressed air into the Pressure•Xchange™ sensor.
- Remove the data/power cable. Place dummy plug in the connector to protect it.
- Dry the instrument and stow it securely.

Configuring the Instrument for Data on Power Up

Perform the following steps:

- Open a terminal emulation program, such as HyperTerminal, and ensure the serial port has been selected in the program. If the instrument has been set to a specific baud rate with the SET DETECT command the terminal emulation program must be configured for that baud rate.
- Connect the instrument to the computer using the data/power cable supplied with the instrument.
- Using the terminal emulation program issue the following commands to the instrument:
    - SET STARTUP NOHEADER (disables the power up header information)
    - SET STARTUP MONITOR (enable data output on power up)
    - SET SAMPLE RATE 10/S (set the desired sampling rate)
    - SET DETECT 07 (set fixed 38400 baudrate)

      Note details on the SET DETECT command can be found in the appendix.
- Unplug the data/power cable from the instrument to turn the instrument off.
- Plug the data/power cable into the instrument to turn the instrument on.

Disabling Data on Power Up

Perform the following steps:

- Open a terminal emulation program, such as HyperTerminal, and ensure the serial port has been selected in the program. If the instrument has been set to a specific baud rate with the SET DETECT command the terminal emulation program must be configured for that baud rate.
- Connect the instrument to the computer using the data/power cable supplied with the instrument. Instrument data will stream through the terminal emulation program window.
- Unplug the data/power cable from the instrument to turn the instrument off.
- Hold down < ENTER >
- Plug the data/power cable into the instrument to turn the instrument on.
- Release the <ENTER> key once the prompt '>' is displayed.
- Using the terminal emulation program issue the following commands to disable data on power up:
    - SET STARTUP HEADER (enables the power up header information)
    - SET STARTUP PROMPT (disable data output on power up)
    - SET SAMPLE RATE 10/S (selects the desired sampling rate)
    - SET DETECT A7 (set 10 autobaud attempts then default to 38400 baud)

      Note details on the SET DETECT command can be found in the appendix.
- Unplug the data/power cable from the instrument to turn the instrument off.

Maintaining the Instrument

Periodic Maintenance

Periodic maintenance will prolong the life of the instrument. The following is recommended:

- If the Xchange™ sensor is very dirty or oily use warm soapy water and allow the instrument to soak before cleaning with a rag or soft brush. Rinse with fresh water.
- Before each use
    - Check the tightness of the swappable sensor
    - Check for nicks and cuts on the cable (If you are using a cable on this application)
- After each use
    - Clean and rinse the Xchange™ using fresh water
    - Dry and safely store the instrument
- Yearly
    - Send the instrument or Xchange™ sensors to a service centre for diagnostics and re-calibration

Communications

PC Settings

The OEM Xchange™ Secondary Mount will communicate with either RS-232, RS-485 or TTL serial connections depending on how the instrument was ordered from the factory. The computer to which the instrument is connected must be set up as follows:

- 8 bits
- 1 stop bit
- No parity
- No hardware handshaking
- Baud rate of 600, 1200, 2400, 4800, 9600, 19,200 or 38,400 baud (default)

After power up, the OEM Xchange™ Secondary Mount will wait for an ASCII carriage return. The instrument will automatically detect the baud rate when the enter key is depressed.

Output Formats

Output formats can be modified by the user. If the modifications required are not supported by the commonly used command list in the next section, please contact the factory for assistance.

The user can change:

- The number of decimal places for each channel
- Turn on, or off, power up information (header),
- Turn on, or off, automatic monitoring on power up

Default output format

The output from the OEM Xchange™ Secondary Mount is space separated values. There are commands to change the delimiter to tab or comma separated values if required.

The following table shows the output units for each Xchange™ sensor.

Sensor	Units	Default Format	Notes
Pressure•Xchange™	dBar	1234.56	
Temperature•Xchange™	C	12.345	
Turbidity•Xchange™	NTU	12.3	

Example outputs:

Example outputs for a sound velocity Xchange™ sensor are shown below.
User inputs in the output capture shown below are in bold type.

```
Micro.X Pressure Version 1.01 SN:007803
AML Oceanographic Ltd.
P.Xchange Sensor SN:300239, Calibrated 01/26/12 Slot 1
```

>**scan**
0000.16
>**monitor**
0000.16
0000.16
0000.16
0000.16
0000.16
>**display options**
[Instrument]
Type=Micro.X Pressure
SN=007803
Firmware=1.01
SampleUnits=continuous
SampleInterval=0
DisplayHeader=yes
StartupMode=Prompt
DetectionMode=a5
RX=on
TrailingSpace=on
PressureFormat=42
TemperatureFormat=23
StartupRawReal=Real
PressureUnits=dbar
TemperatureUnits=Celcius
Latitude=+45.000
PressureOffset=+0.000
UsePressureOffset=no
AddressMode=off
AddressByte=09
SerialParity=none
SerialEcho=on
CommunicationsDelay=0
[Channel 1]
SensorName1=P.Xchange
Slot1=1
BoardSN1=007803
SensorSN1=300239
CalDate1=01/26/12
CalBy1=MT~
CalRange1=0-100 dbar
CalAccuracy1=0.012 %FS
PA=-1.239642E+01
PB= 0.000000E-01
PC= 0.000000E-01
PD= 0.000000E-01
PE= 1.874044E-03
PF= 0.000000E-01
PG= 0.000000E-01
PH= 0.000000E-01
PI= 5.591269E-10
PJ= 0.000000E-01

PK= 0.000000E-01
PL= 0.000000E-01
PM=-3.744591E-16
>

NMEA-like output format

The OEM Xchange™ Secondary Mount can be configured to produce an output similar to that regulated by the National Marine Electronics Association or NMEA as follows:

$AML,TUN,301.2,SN,600013*38

where $AML is always present, TUN identifies the next value as turbidity in NTU, and the sensor serial is also displayed. * identifies the end of the data, and the following two characters are the NMEA checksum in hexadecimal. It's calculated by XORing all the characters in the string except the $ and * characters. The following table lists all format codes.

Code	Description	Units
PD	Pressure	deciBar
PP	Pressure	psi
PM	Pressure	meters
PF	Pressure	feet
TC	Temperature	celsius
TF	Temperature	fahrenheit
TUN	Turbidity	Nephelometric Turbidity Units
SN	Serial Number	---

To configure NMEA-like output the following commands are used with a terminal emulation program, such as Hyperterminal:

- SET NMEAON (turns on NMEA-like format)
- SET NMEAOFF (turns off NMEA-like format)

The AUTOMONITOR command is often used when NMEA-like output is enabled. It allows MONITOR mode to be automatically entered after a period of no activity on the user terminal. Time is 0 for no timeout (i.e. the command line waits forever for a command) to 255 seconds. To configure AUTOMONITOR the following commands are used:

- SET AUTOMONITOR 10 (MONITOR starts after 10 sec of inactivity)
- SET AUTOMONITOR 30 (MONITOR starts after 30 sec of inactivity)
- SET AUTOMONITOR 0 (MONITOR deactivated)

Example outputs:

>**set nmeaon**
NMEA-like output enabled
>**monitor**
$AML,TUN,514.3,SN,600013*3B
$AML,TUN,514.4,SN,600013*3C
$AML,TUN,514.2,SN,600013*3A

$AML,TUN,514.1,SN,600013*39

> **set nmeaoff**

NMEA-like output disabled

>**monitor**

514.6
514.8
514.9
515.1

>**set automonitor 10**

Automonitor set to10 sec

Customer Support

Troubleshooting

Instrument fails to communicate:

- Check the cables
    - Is the data power cable connected to the circuit board terminal block and computer?
    - Are there any cuts in the cable?

- If powering over a long cable, check the voltage drop over the cable. Measure the voltage at the circuit boards. The voltage must be above 8 volts.

- Are the communication settings in the program used on the computer correct?
    - Comm port selection
    - 8 bits
    - 1 stop bit
    - No parity
    - No hardware handshaking
    - Baud rate between 600 and 38,400 baud

- Are the communication settings in the instrument correct?
    - Was the instrument specifically set to one baud rate last time? If so, the user must use that baud rate to resume communications.
    - Was the instrument set to RX OFF last time? If so, a carriage return must be sent to the instrument immediately after power is applied to interrupt this mode.
    - Was the instrument set to monitor on power up mode? If so, a carriage return must be sent to the instrument immediately after power is applied to interrupt this mode

Instrument generates noisy data:

- Are the wires secure in the terminal block on the circuit boards?
- Is there noise on the power supply? Switching power supplies are common sources of noise.
- Nearby EMI sources such as electric motors can create noise. If possible move the instrument and its cables away from the noise source. Is the instrument securely fastened to prevent vibrations?
- Is the Temperature•Xchange™ sensor damaged?
- Is there something nearby affecting the water temperature?
- Is there dirt in the Pressure•Xchange™ sensor?
- Is there something in the water flow ahead of the pressure sensor shedding vortices into the pressure sensor?

AML Oceanographic Contact Info

Service:
To request an RMA or technical support
Email: service@AMLoceanographic.com
Phone: 1-250-656-0771
Fax: 1-250-655-3655

Sales:
For all general sales inquiries
Email: sales@AMLoceanographic.com
Phone: 1-250-656-0771
Fax: 1-250-655-3655

Website:
http://www.AMLoceanographic.com

My AML Oceanographic:

My AML Oceanographic is AML's on-line data centre. This secure area within our website is designed to offer one easy location for interested individuals and organizations - distributors, customers, prospects, and other members of our community - to manage their interactions with AML. The functionality within **My AML Oceanographic** is expected to evolve quickly. Upon launch, **My AML Oceanographic** will allow you to:

- View and manage your assets (instruments and sensors)
- Consult instrument diagnostic summaries
- View and download calibration and conformity certificates
- View and manage your technical support cases
- Consult and download sales estimates, sales orders, and invoice copies
- View account balances and generate account statements
- Assess inventory availability at AML

Appendices

Commands

When using SeaCast, the command set is not usually necessary. However, text commands are available. Below is a listing of commonly used commands. Note that some commands are only be available on instruments equipped with the appropriate Xchange™ sensors.

Communications commands

Note – Board set will dictate whether communications are RS-232, RS-485, or TTL.

Command	Description	Requires
DISPLAY DETECT	Displays the baud rate detection settings.	
SET DETECT ab	Sets the baud rate detection. 'a' sets the number of autobaud detection attempts before the instrument reverts to the default baud rate set by 'b'. Setting 'a'=0 forces the instrument to a fixed baud rate determined by 'b'. 'b'= 1 = 600 baud 4 = 4800 baud 7 = 38400 baud 2 = 1200 baud 5 = 9600 baud 8 = 57600 baud 3 = 2400 baud 6 = 19200 baud 9 = 115200 baud	

Sampling rate commands

Command	Description	Requires
DISPLAY SAMPLE RATE	Displays the time based sampling rate	
SET SAMPLE n t	Sets the desired sampling rate. 'n' is a number and t is the time units. Examples are SET S C sets the sampling to continuous (25 Hz) SET S 5 /s 5 samples per sec SET S 1 s 1 sample per second SET S 2 /m 2 samples per minute SET S 5 m 1 sample every 5 minutes SET S 2 /h 2 samples per hour SET S 24 h 1 sample every 24 hours	

Output format commands

Command	Description	Requires
DISPLAY STARTUP	Displays the power up output settings	
SET LATITUDE dd.dddddd	Sets the current latitude within a range of -90 to +90 degrees. Latitude is used in calculating depth from pressure. Contact AML Sales for more information on the equation.	
SET PRESSURE UNITS x/y	Sets units for real output to x/y. Where x/y = dbar, psi, metres, feet. When changing units to feet or metres the user must set latitude, as the depth calculation corrects for surface gravity. Contact AML Sales for more information on the equation.	
SET TEMPERATURE UNITS x/y	Set units for real output to x/y. Where x/y = celsius, fahrenheit.	
SET STARTUP PROMPT	Sets the instrument to wait for user commands on power up.	
SET STARTUP SCAN	Sets the instrument to output one scan on power up and then wait for a user command.	
SET STARTUP MONITOR	Sets the instrument to start monitoring data on power up	
SET STARTUP NOHEADER	Disables the instrument identification header output on power up.	
SET STARTUP HEADER	Enables the instrument identification header output on power up.	
SET NMEAON	Turns NMEA-like format on	
SET NMEAOFF	Turns NMEA-like format off	
SET AUTOMONITOR x	Automatically starts MONITOR after x seconds of command line inactivity (0≤x≤255). If x=0 AUTOMONITOR is disabled	
SET xxxxx FORMAT ab	Changes the numerical output format of the sensor. Where xxxxx=sensor type (TEMPERATURE, TURBIDITY, or PRESSURE). a = number of digits ahead of the decimal place. b = number of digits after the decimal place	Any sensor

General commands

Command	Description	Requires
SCAN	Measure and output one scan of data	

MONITOR	Scan at the set sampling rate.	
VERSION	Displays the instrument identification header.	
DISPLAY OPTIONS	Displays the instrument status and user settings	
ZERO ON	Corrects the barometric offset to set zero pressure at surface for current barometric pressure	P•X
ZERO OFF	Disables barometric offset	P•X
DETECT	Checks each slot in logger board to identify what is plugged in and displays sensor / board type & serial number or empty for each slot.	

Technical Specifications

Sensors

Secondary Xchange™ Sensors					
Type	Range	Accuracy	Precision	Resolution	Response Time
Temperature•Xchange™	-2°C to 32°C	±0.005°C	±0.003°C	0.001°C	100 ms
Temperature•Xchange™	-5°C to 45°C	±0.008°C	±0.004°C	0.001°C	100 ms
Pressure•Xchange™	50, 100, 200, 500, 1000, 2000, 4000, 5000 & 6000 dbars	±0.05%FS	±0.003%FS	0.002%FS	10 ms
Turbidity•Xchange™	100, 400, 1000, 3000 NTU	up to +/-3% NTU	up to +/-3% NTU	up to +/- 0.5 NTU	< 0.7s (3s to 95%)

* Pre-Release Specifications. Final Specifications to be determined

Electrical

- Communications Board
  - RS-232 Comm board or
  - RS-485 Comm board
  - TTL (single board)
- Sensor Boards
  - PxTx Xchange™ sensor board
- Factory set RS232 or RS485 (½ duplex ASCII)
- Autobaud to 38,400

Power

External Power Supply		
Comms Configuration	Type	Voltage range
RS-232 or RS-485	External	8 to 26 VDC
TTL	External	6 to 16 VDC

Current Consumption			
Type	Sensor	Standby	Sampling
Secondary	Temperature•Xchange™	85 mA	85 mA
Secondary	Pressure•Xchange™	50 mA	50 mA

Secondary	Turbidity•Xchange™	75 mA	75 mA

Sampling Capabilities

- Frequency
  - Time: selectable sample rates from 25 per second to 1 per hour
- Configurations
  - Single scan or continuous output
  - on command or autonomous on power up

Included Items

- OEM Xchange™ Secondary Mount
- Secondary Blanking Plug
- CD with manuals and documentation

Software

- SeaCast

Ordering Codes

Instruments

PDC-OEX-SV-232	OEM Xchange™ SV Mount and Electronics for RS-232 Communications
PDC-OEX-SV-485	OEM Xchange™ SV Mount and Electronics for RS-485 Communications
PDC-OEX-SV-TTL	OEM Xchange™ SV Mount and Electronics, Direct TTL Communications

Sensors

XCH-TMP-n232	T•Xchange™ Calibrated Sensor, -2 to 32 C Range
XCH-TMP-n245	T•Xchange™ Calibrated Sensor, -2 to 45 C Range
XCH-TMP-n545	T•Xchange™ Calibrated Sensor, -5 to 45 C Range
XCH-PRS-0050	P•Xchange™ 50 dBar
XCH-PRS-0100	P•Xchange™ 100 dBar
XCH-PRS-0200	P•Xchange™ 200 dBar
XCH-PRS-0500	P•Xchange™ 500 dBar
XCH-PRS-1000	P•Xchange™ 1000 dBar
XCH-PRS-2000	P•Xchange™ 2000 dBar
XCH-PRS-4000	P•Xchange™ 4000 dBar
XCH-PRS-5000	P•Xchange™ 5000 dBar
XCH-PRS-6000	P•Xchange™ 6000 dBar
XCH-PRS-6000-T065	P•Xchange™ 6000 dBar, Extended temperature calibration from 0-65 C
XCH-PRS-10000	P•Xchange™ 10000 dBar
XCH-TRB-0100	Turbidity•Xchange™ 100 NTU
XCH-TRB-0400	Turbidity•Xchange™ 400 NTU
XCH-TRB-1000	Turbidity•Xchange™ 1000 NTU
XCH-TRB-3000	Turbidity•Xchange™ 3000 NTU

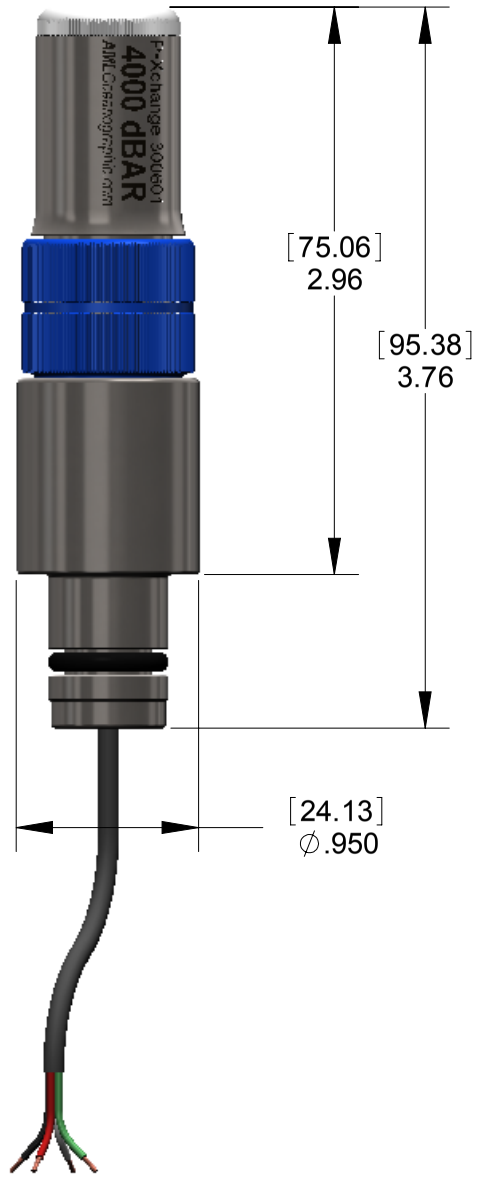
Warranty

AML warrants the instrument for a period of two years from the date of delivery. AML will repair or replace, at its option and at no charge, components which prove to be defective. The warranty applies only to the original purchaser of the instruments. The warranty does not apply if the instrument has been damaged, by accident or misuse, and is void if repairs or modifications are made by other than authorized personnel.

This warranty is the only warranty given by AML. No warranties implied by law, including but not limited to the implied warranties of merchantability and fitness for a particular purpose shall apply. In no event will AML be liable for any direct, indirect, consequential or incidental damages resulting from any defects or failure of performance of any instrument supplied by AML.

OEM Xchange™ Secondary Overview Drawings

THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF AML OCEANOGRAPHIC.
ANY REPRODUCTION IN PART OR WHOLE WITHOUT THE WRITTEN PERMISSION OF AML OCEANOGRAPHIC IS PROHIBITED



P Xchange Sensor
Weight:65 grams

2X 2-015-N70D O-RINGS

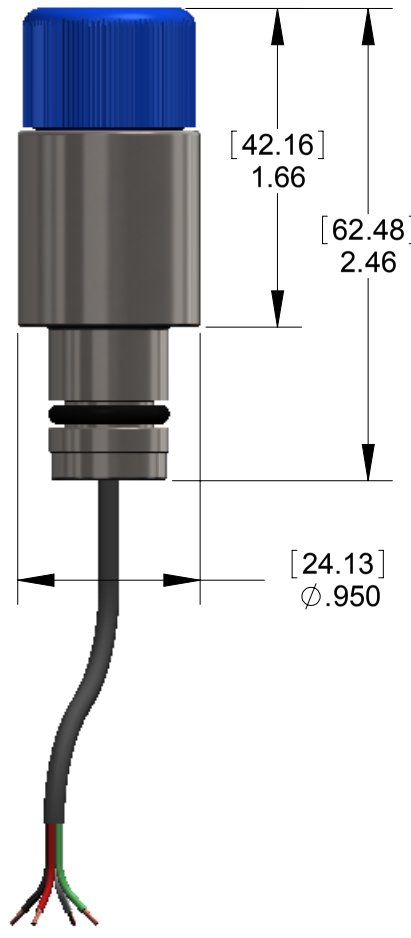
P/T Xchange Titanium Bulkhead
AML Part No: SUB-G0581
Weight: 50 grams

2-111-N70D O-RING

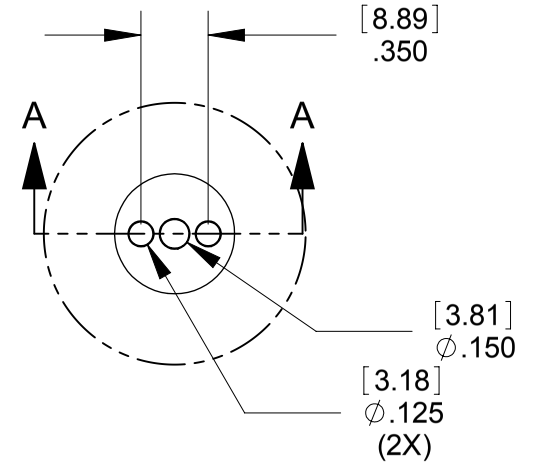
P Xchange SENSOR ASSEMBLY

P/T Xchange Blanking Plug
AML No: PLS-SU009

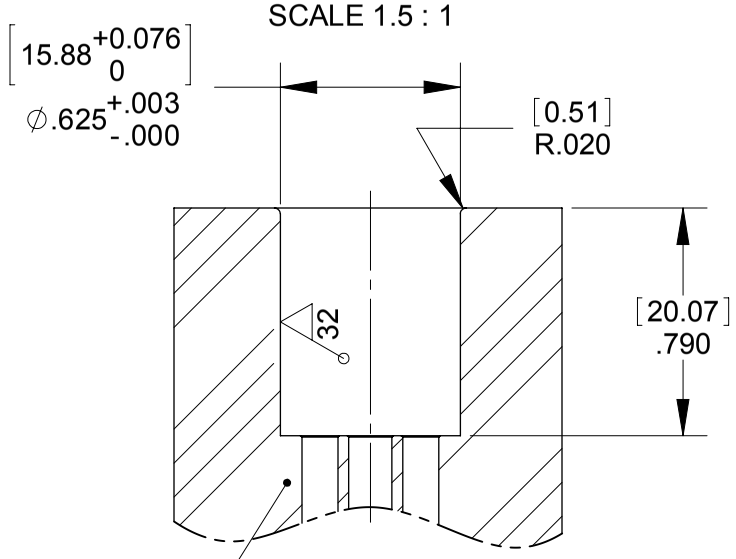
2X 2-015-N70D O-RINGS



BLANKING PLUG ASSEMBLY



SECTION A-A
SCALE 1.5 : 1



LEAVE SUFFICIENT THICKNESS
FOR FORCES GENERATED AT
DESIGN PRESSURE.

MOUNTING REQUIREMENTS

REV	DESCRIPTION	BY	DATE
B	FIXED WIRING TTL INTERFACE	DO	25NOV2013
A	ADDED SHEET 3: TTL INTERFACE	B.P.	20/03/12

AML OCEANOGRAPHIC
Xchange your old ideas
2071 Malaview Ave., Sidney B.C. Canada, V8L 5X6 Ph: (250) 656 0771 Fax: (250) 655 3655

THIS DRAWING CONFORMS TO ASME Y14.5-2009

DIMENSIONS AND TOLERANCES:
UNITS: INCHES [MM]
ANGLES: ± 1°
FRACTIONS: ± 1/32
HOLE SIZES: ± 0.005(0.13)
0.00: ± 0.015(0.38)
0.000: ± 0.005(0.13)

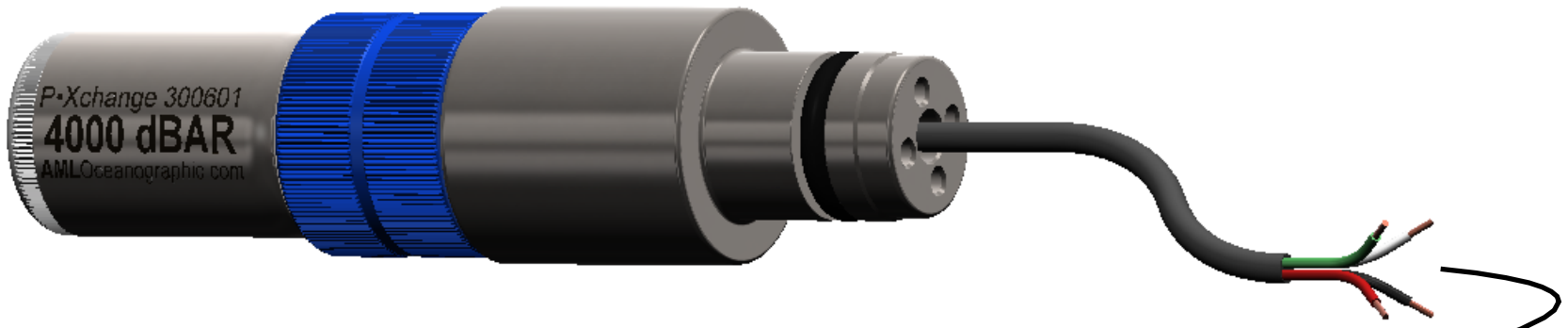
UNLESS OTHERWISE SPECIFIED:
ORIGINAL SCALE:1:1
HOLE DEPTHS GIVEN FOR FULL DIAMETER.
SURFACE FINISH: 63

TITLE:
P Xchange OEM Specifications

DRAWN	*DATE*	*DRAWING NO.:* *REV*	*AML NO.*
I.L.	FEB 01/10	SNP-GQ-03297-B	UNSPECIFIED
REVISION B.P.	*DATE* MAR 20/12	*MATERIAL:* N/A	
	SIZE B	*SLD FILE NO.:* SNP-GQ-03297	*SHEET NO.* Sheet 1 of 3

THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF AML OCEANOGRAPHIC.
ANY REPRODUCTION IN PART OR WHOLE WITHOUT THE WRITTEN PERMISSION OF AML OCEANOGRAPHIC IS PROHIBITED

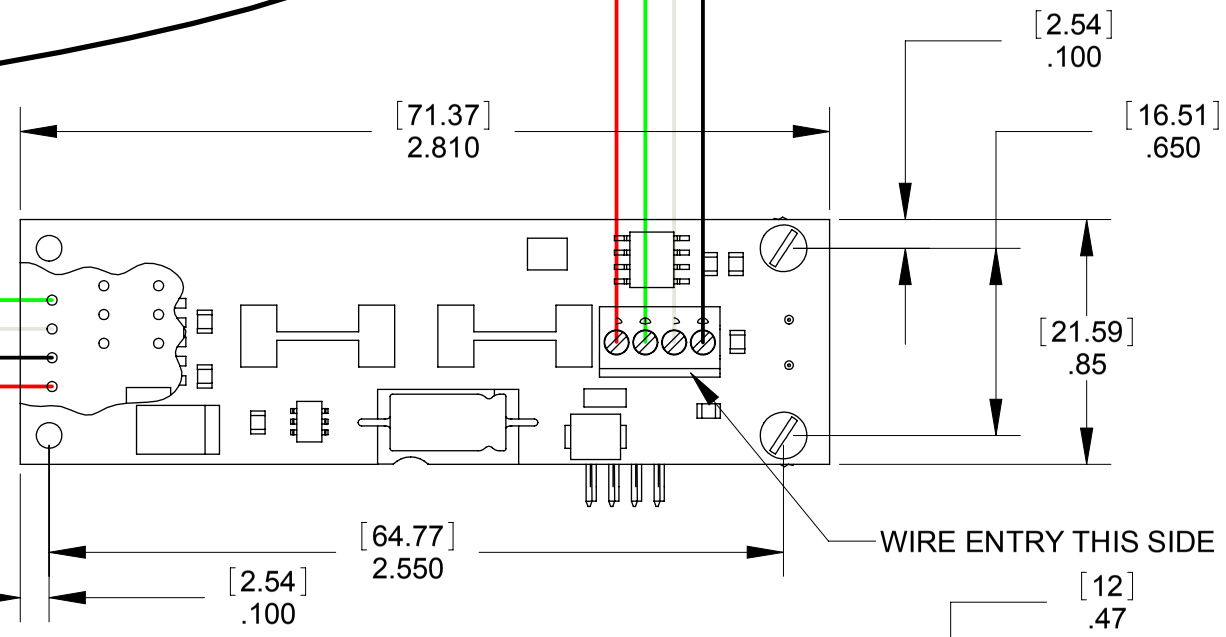
P XCHANGE ELECTRONICS

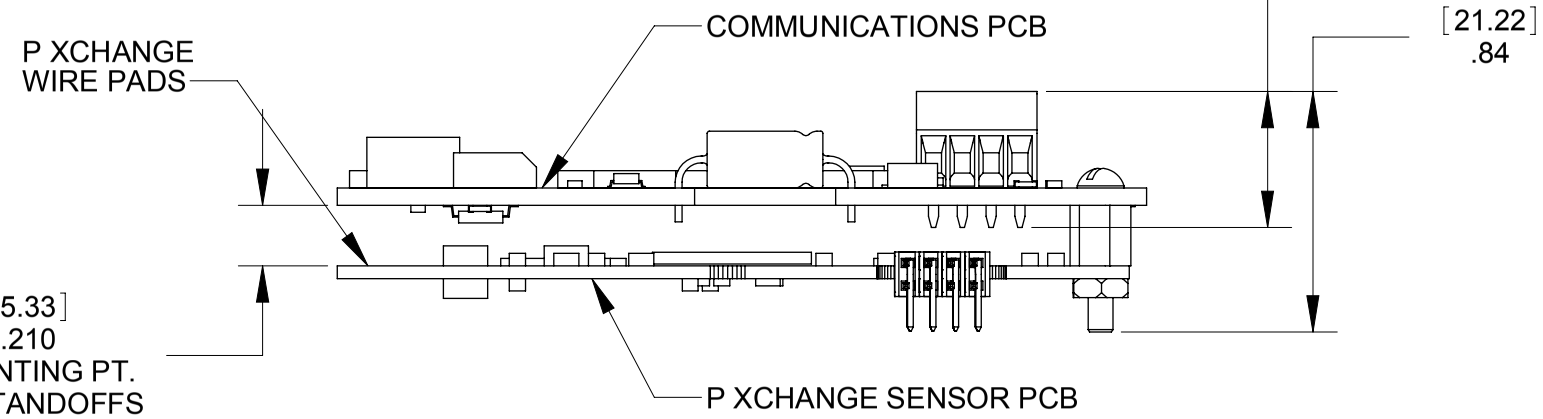


WIRES TO RS-232

POWER (RED) — +
TRANSMIT (GREEN)
8 - 16VDC
RECEIVE (WHITE)
GROUND (BLACK) — -

GROUND (SHIELD)
MEMORY (WHITE)
TRANSMIT (BLACK)
POWER(+12V) (RED)





AML OCEANOGRAPHIC
Xchange your old ideas
2071 Malaview Ave., Sidney B.C. Canada, V8L 5X6 Ph: (250) 656 0771 Fax: (250) 655 3655

THIS DRAWING CONFORMS TO ASME Y14.5-2009

DIMENSIONS AND TOLERANCES:

UNITS:	INCHES [MM]
ANGLES:	± 1°
FRACTIONS:	± 1/32
HOLE SIZES:	± 0.005(0.13)
0.00:	± 0.015(0.38)
0.000:	± 0.005(0.13)

UNLESS OTHERWISE SPECIFIED:
ORIGINAL SCALE:1:1
HOLE DEPTHS GIVEN FOR FULL DIAMETER.
SURFACE FINISH: 63

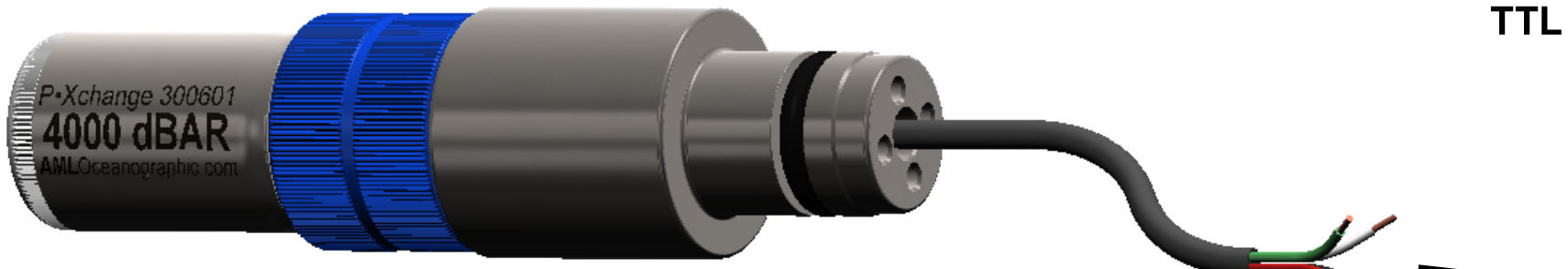
TITLE:
P Xchange OEM Specifications

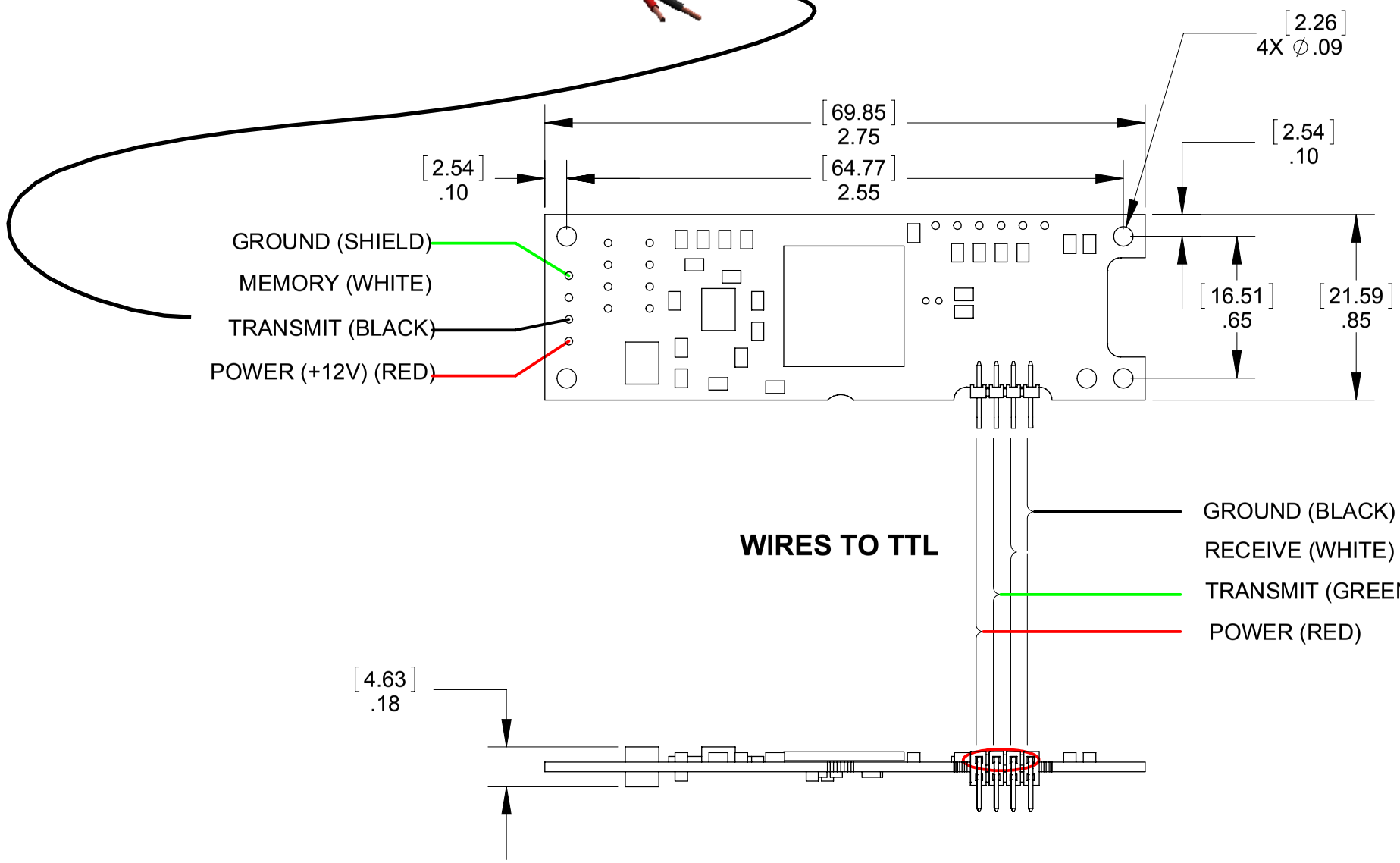
REV	DESCRIPTION	BY	DATE
B	FIXED WIRING TTL INTERFACE	DO	25NOV2013
A	ADDED SHEET 3: TTL INTERFACE	B.P.	20/03/12

DRAWN	DATE	DRAWING NO.: REV	AML NO.
I.L.	FEB 01/10	SNP-GQ-03297-B	UNSPECIFIED
REVISION	DATE	MATERIAL:	
B.P.	MAR 20/12	N/A	
	SIZE B	SLD FILE NO.: SNP-GQ-03297	SHEET NO. Sheet 2 of 3

THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF AML OCEANOGRAPHIC.
ANY REPRODUCTION IN PART OR WHOLE WITHOUT THE WRITTEN PERMISSION OF AML OCEANOGRAPHIC IS PROHIBITED

P XCHANGE ELECTRONICS OVERVIEW
TTL INTERFACE





AML OCEANOGRAPHIC
Xchange your old ideas
2071 Malaview Ave., Sidney B.C. Canada, V8L 5X6 Ph: (250) 656 0771 Fax: (250) 655 3655

REV	DESCRIPTION	BY	DATE
B	FIXED WIRING TTL INTERFACE	DO	25NOV2013
A	ADDED SHEET 3: TTL INTERFACE	B.P.	20/03/12

THIS DRAWING CONFORMS TO ASME Y14.5-2009

DIMENSIONS AND TOLERANCES:

UNITS:	INCHES [MM]
ANGLES:	± 1°
FRACTIONS:	± 1/32
HOLE SIZES:	± 0.005(0.13)
0.00:	± 0.015(0.38)
0.000:	± 0.005(0.13)

UNLESS OTHERWISE SPECIFIED:

ORIGINAL SCALE:1:1

HOLE DEPTHS GIVEN FOR FULL DIAMETER.

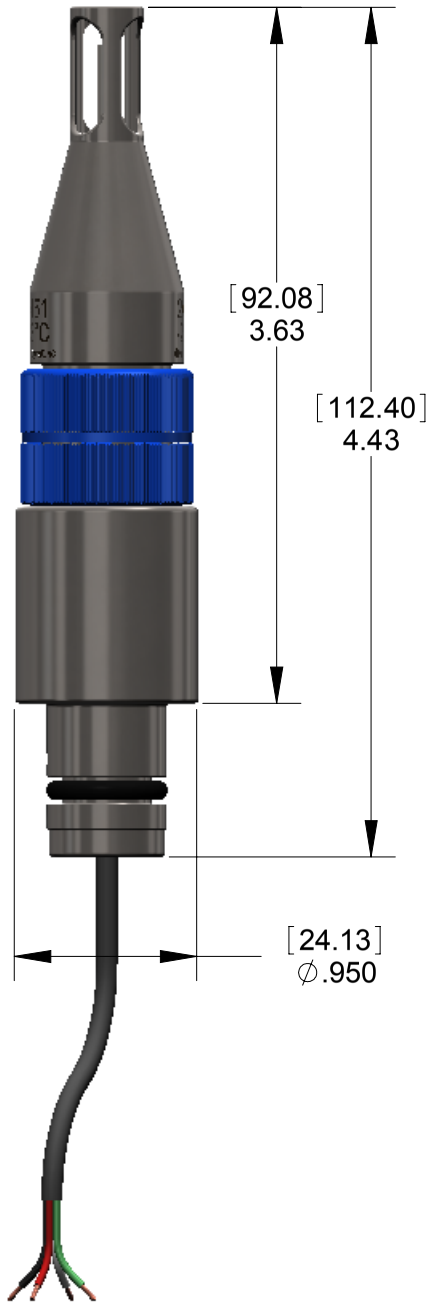
SURFACE FINISH: 63

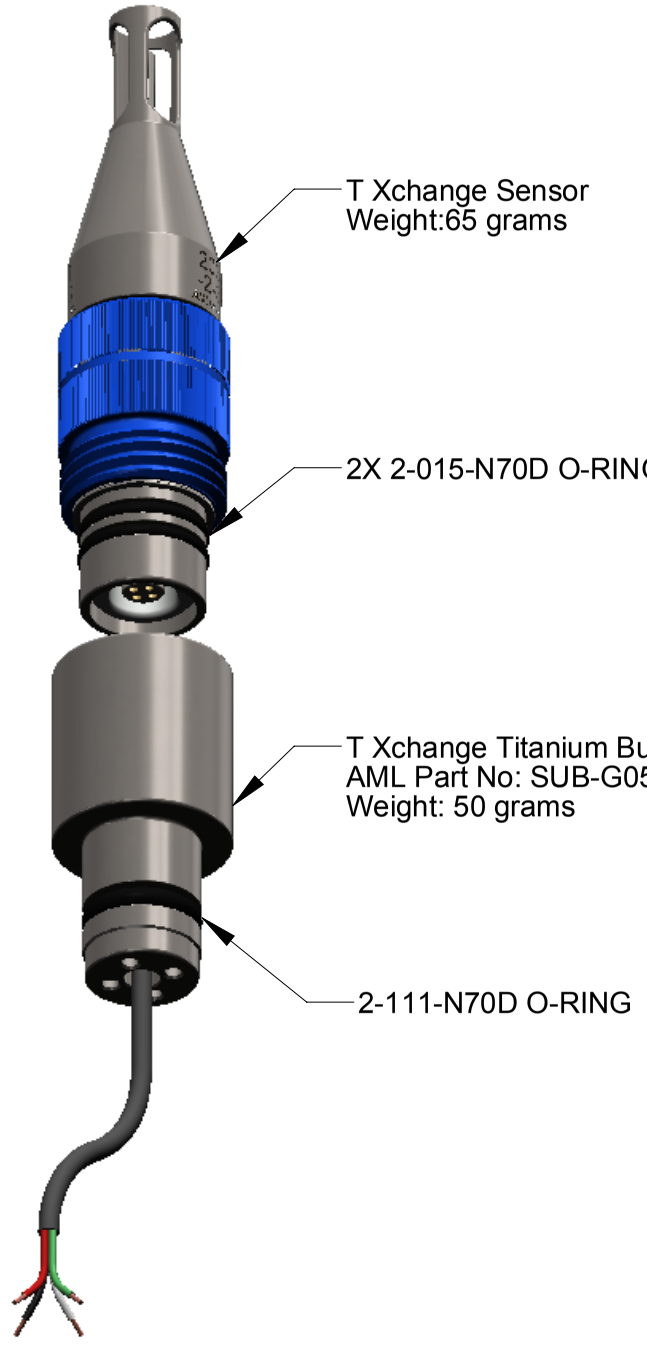
TITLE:

P Xchange OEM Specifications

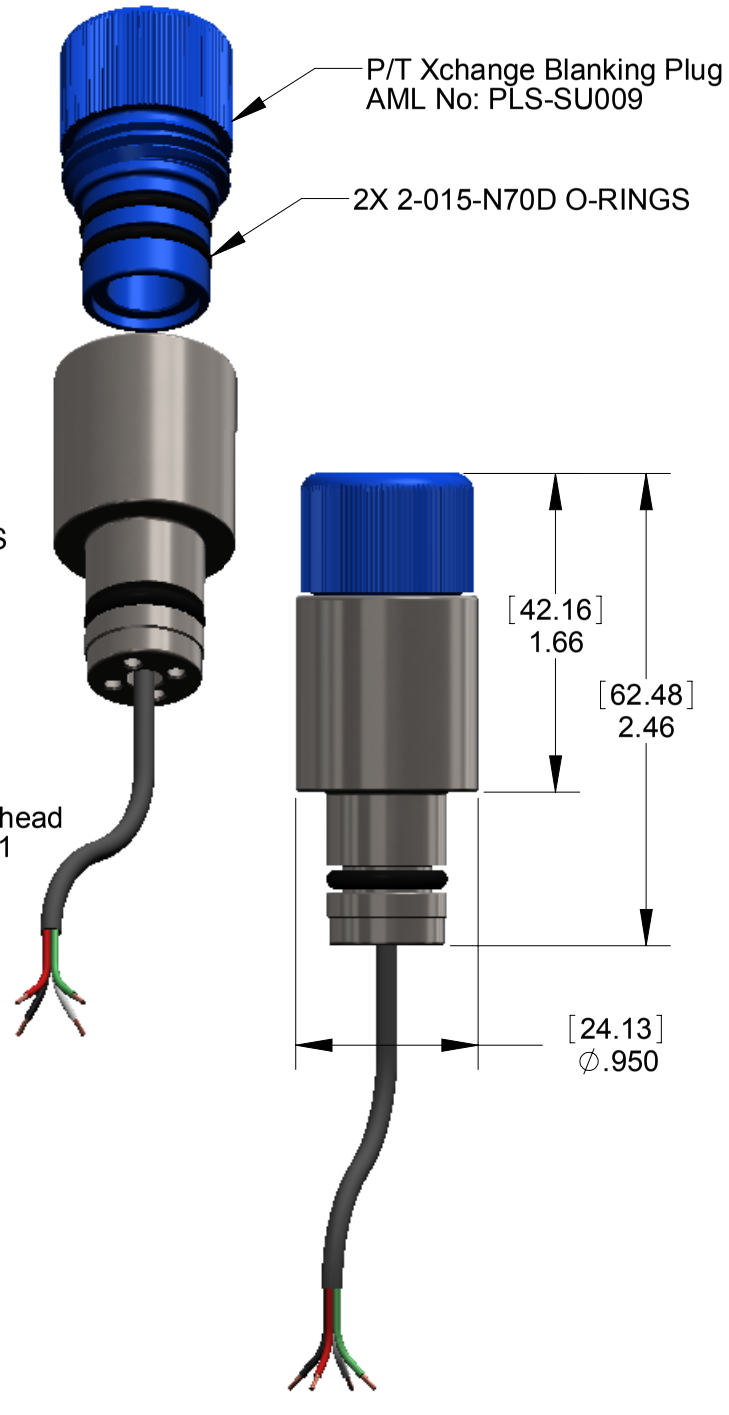
DRAWN	DATE	DRAWING NO.: REV	AML NO.
I.L.	FEB 01/10	SNP-GQ-03297-B	UNSPECIFIED
REVISION	**DATE**	**MATERIAL:**	
B.P.	MAR 20/12	N/A	
	SIZE B	SLD FILE NO.: SNP-GQ-03297	SHEET NO. Sheet 3 of 3

THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF AML OCEANOGRAPHIC.
ANY REPRODUCTION IN PART OR WHOLE WITHOUT THE WRITTEN PERMISSION OF AML OCEANOGRAPHIC IS PROHIBITED

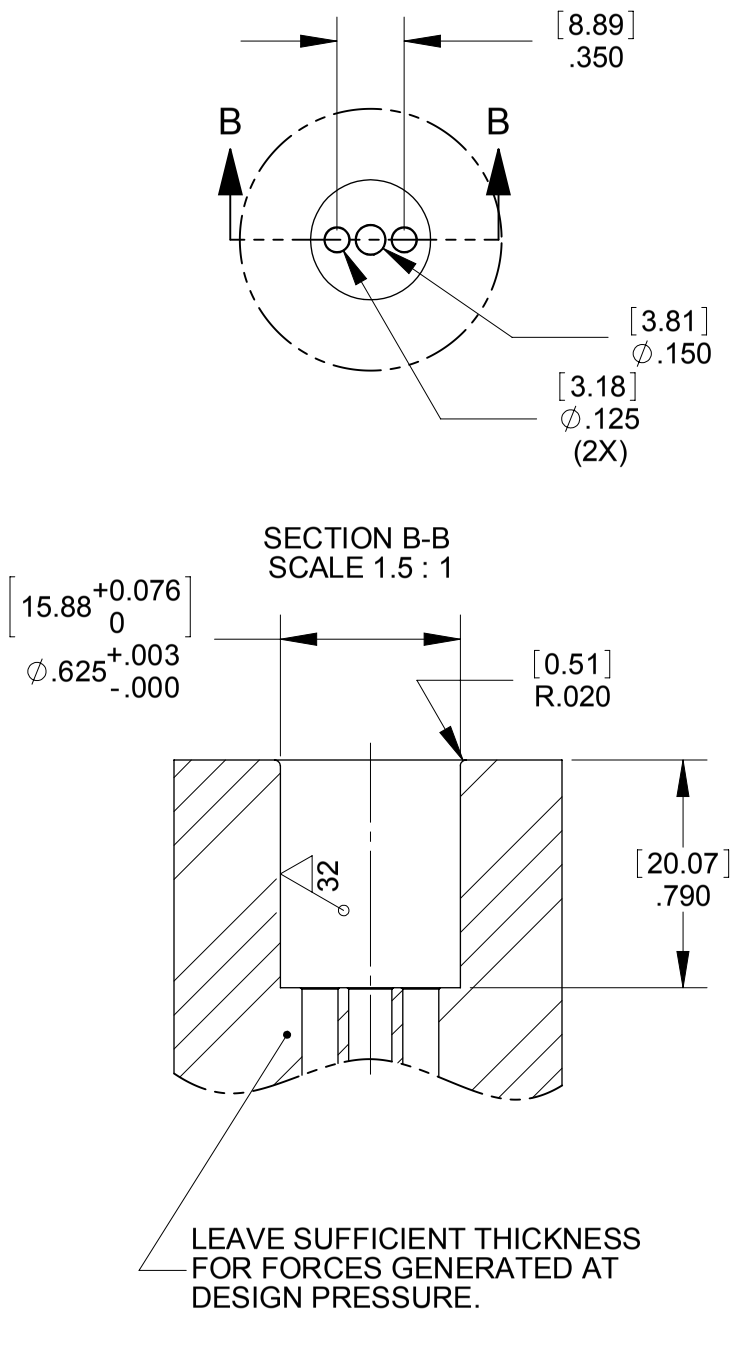




T Xchange SENSOR ASSEMBLY



BLANKING PLUG ASSEMBLY



MOUNTING REQUIREMENTS

REV	DESCRIPTION	BY	DATE
B	FIXED TTL WIRING DIAGRAM	DO	25NOV2013
A	ADDED SHEET 3: TTL INTERFACE	B.P.	20/03/12

AML OCEANOGRAPHIC
Xchange your old ideas
2071 Malaview Ave., Sidney B.C. Canada, V8L 5X6 Ph: (250) 656 0771 Fax: (250) 655 3655

THIS DRAWING CONFORMS TO ASME Y14.5-2009

DIMENSIONS AND TOLERANCES:
UNITS: INCHES [MM]
ANGLES: ± 1°
FRACTIONS: ± 1/32
HOLE SIZES: ± 0.005(0.13)
0.00: ± 0.015(0.38)
0.000: ± 0.005(0.13)

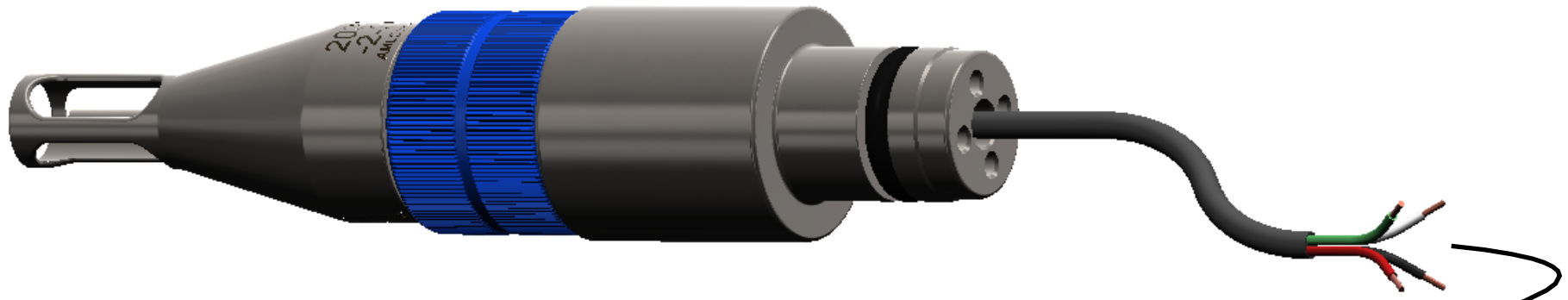
UNLESS OTHERWISE SPECIFIED:
ORIGINAL SCALE:1:1
HOLE DEPTHS GIVEN FOR FULL DIAMETER.
SURFACE FINISH: 63

TITLE: T Xchange OEM Specifications

DRAWN	DATE	DRAWING NO.: REV	AML NO.
I.L.	FEB 01/10	SNT-GA-03353-B	UNSPECIFIED
REVISION B.P.	DATE MAR 20/12	MATERIAL: N/A	
	SIZE B	SLD FILE NO.: SNT-GA-03353	SHEET NO. Sheet 1 of 3

THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF AML OCEANOGRAPHIC.
ANY REPRODUCTION IN PART OR WHOLE WITHOUT THE WRITTEN PERMISSION OF AML OCEANOGRAPHIC IS PROHIBITED

T XCHANGE ELECTRONICS



WIRES TO RS-232

POWER (RED) — +

TRANSMIT (GREEN)

RECEIVE (WHITE)

GROUND (BLACK) — -

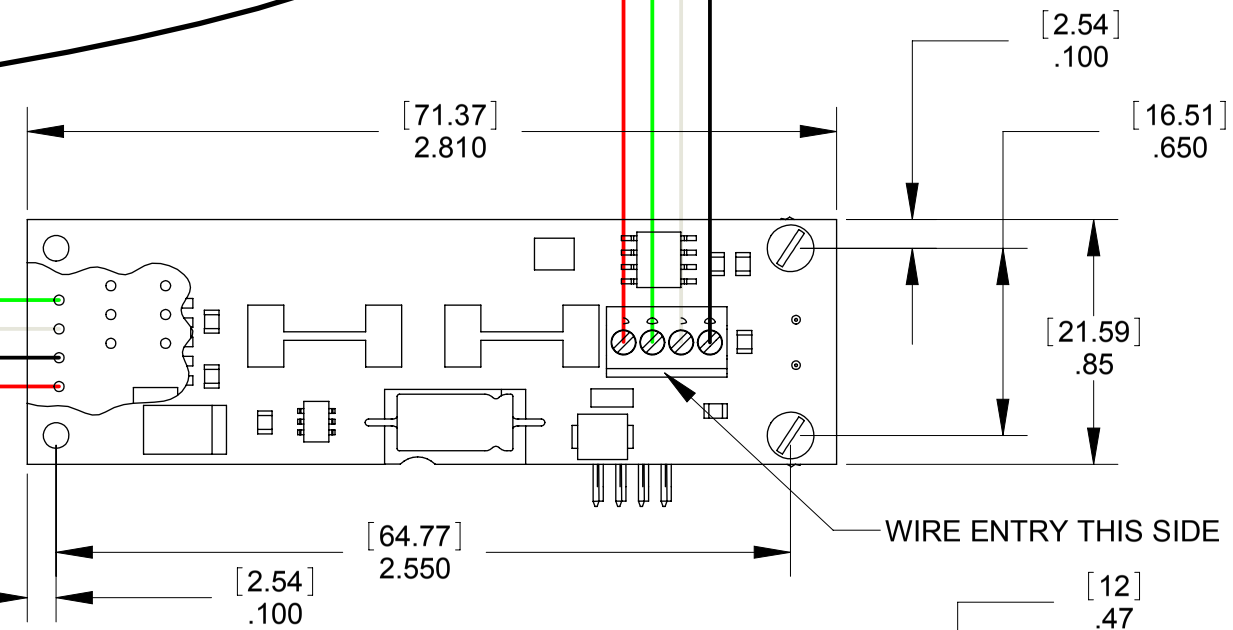
8 - 16VDC

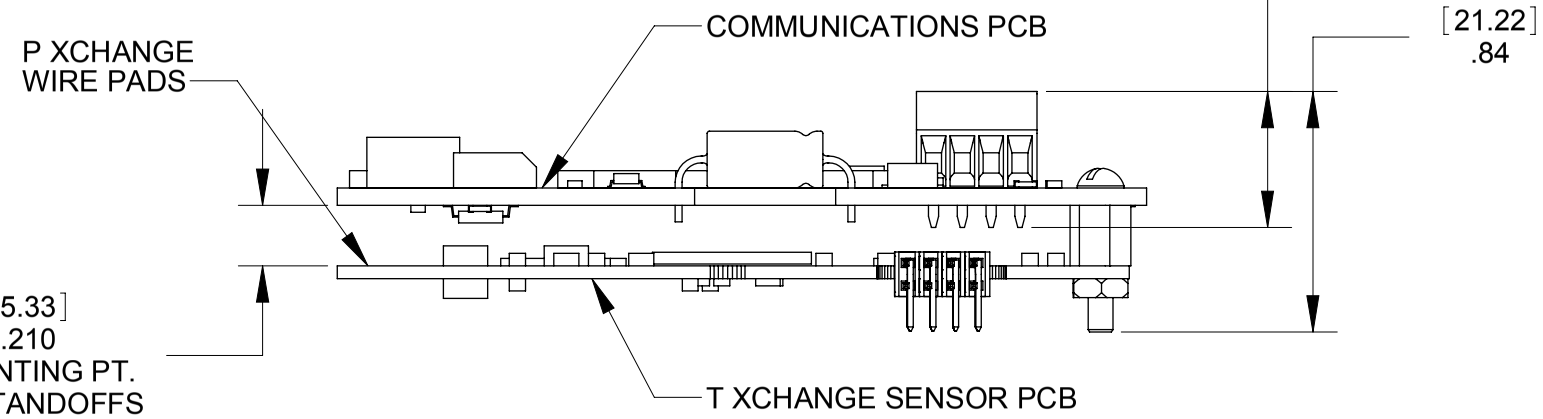
GROUND (SHIELD)

MEMORY (WHITE)

TRANSMIT (BLACK)

POWER(+12V) (RED)





AML OCEANOGRAPHIC
Xchange your old ideas
2071 Malaview Ave., Sidney B.C. Canada, V8L 5X6 Ph: (250) 656 0771 Fax: (250) 655 3655

THIS DRAWING CONFORMS TO ASME Y14.5-2009

DIMENSIONS AND TOLERANCES:

UNITS:	INCHES [MM]
ANGLES:	± 1°
FRACTIONS:	± 1/32
HOLE SIZES:	± 0.005(0.13)
0.00:	± 0.015(0.38)
0.000:	± 0.005(0.13)

UNLESS OTHERWISE SPECIFIED:

ORIGINAL SCALE:1:1

HOLE DEPTHS GIVEN FOR FULL DIAMETER.

SURFACE FINISH: 63

TITLE:

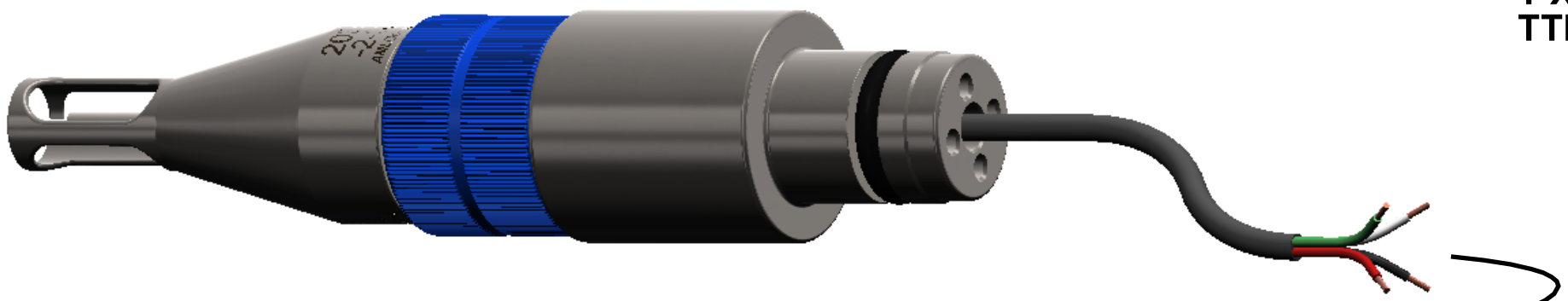
T Xchange OEM Specifications

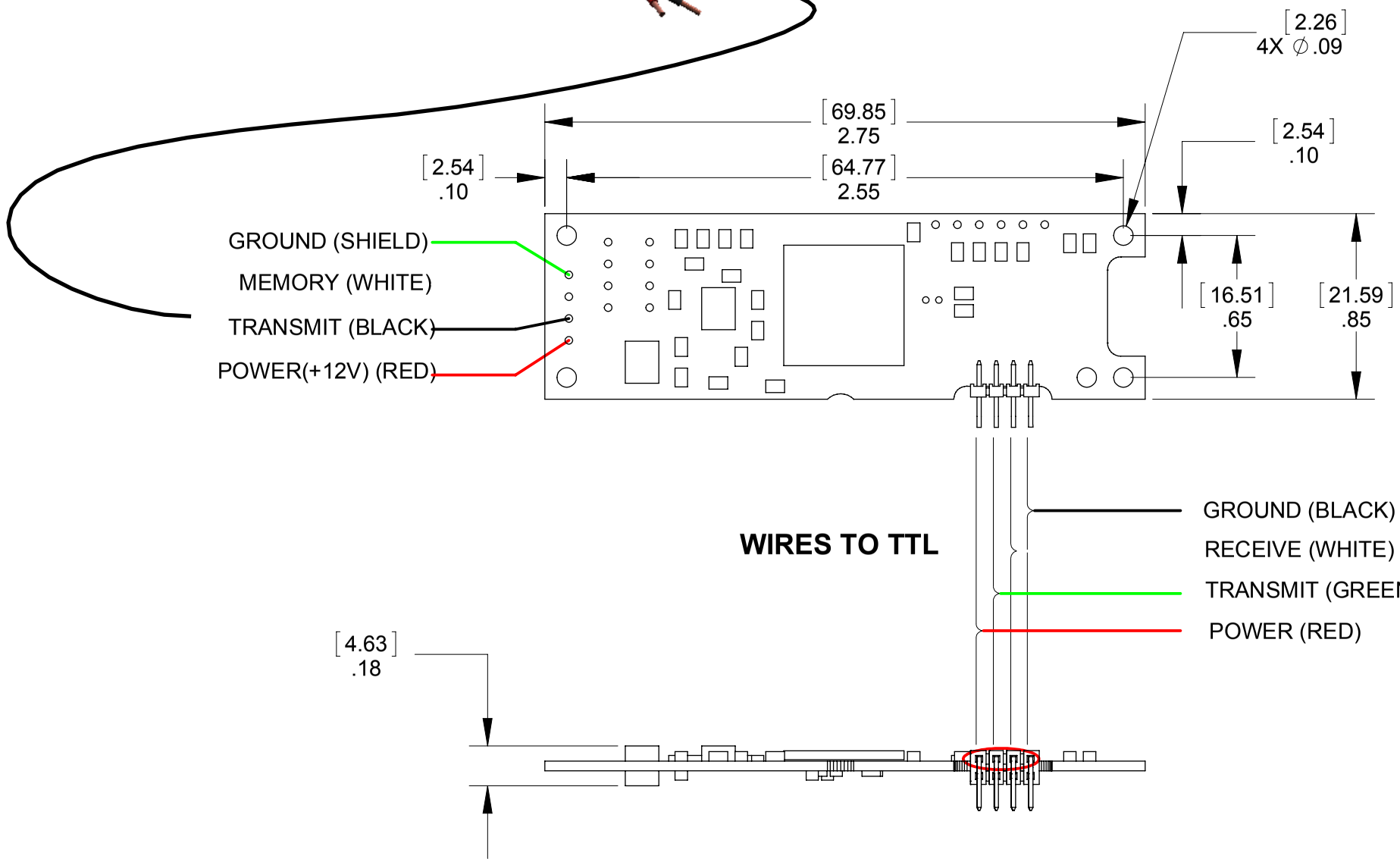
REV	DESCRIPTION	BY	DATE
B	FIXED TTL WIRING DIAGRAM	DO	25NOV2013
A	ADDED SHEET 3: TTL INTERFACE	B.P.	20/03/12

DRAWN	DATE	DRAWING NO.:	REV	AML NO.
I.L.	FEB 01/10	SNT-GA-03353-B		UNSPECIFIED
REVISION	DATE	MATERIAL:		
B.P.	MAR 20/12	N/A		
	SIZE B	SLD FILE NO.: SNT-GA-03353		SHEET NO. Sheet 2 of 3

THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF AML OCEANOGRAPHIC.
ANY REPRODUCTION IN PART OR WHOLE WITHOUT THE WRITTEN PERMISSION OF AML OCEANOGRAPHIC IS PROHIBITED

T XCHANGE ELECTRONICS OVERVIEW
TTL INTERFACE





REV	DESCRIPTION	BY	DATE
B	FIXED TTL WIRING DIAGRAM	DO	25NOV2013
A	ADDED SHEET 3: TTL INTERFACE	B.P.	20/03/12

AML OCEANOGRAPHIC
Xchange your old ideas
2071 Malaview Ave., Sidney B.C. Canada, V8L 5X6 Ph: (250) 656 0771 Fax: (250) 655 3655

THIS DRAWING CONFORMS TO ASME Y14.5-2009

DIMENSIONS AND TOLERANCES:

UNITS:	INCHES [MM]
ANGLES:	± 1°
FRACTIONS:	± 1/32
HOLE SIZES:	± 0.005(0.13)
0.00:	± 0.015(0.38)
0.000:	± 0.005(0.13)

UNLESS OTHERWISE SPECIFIED:

ORIGINAL SCALE:1:1

HOLE DEPTHS GIVEN FOR FULL DIAMETER.

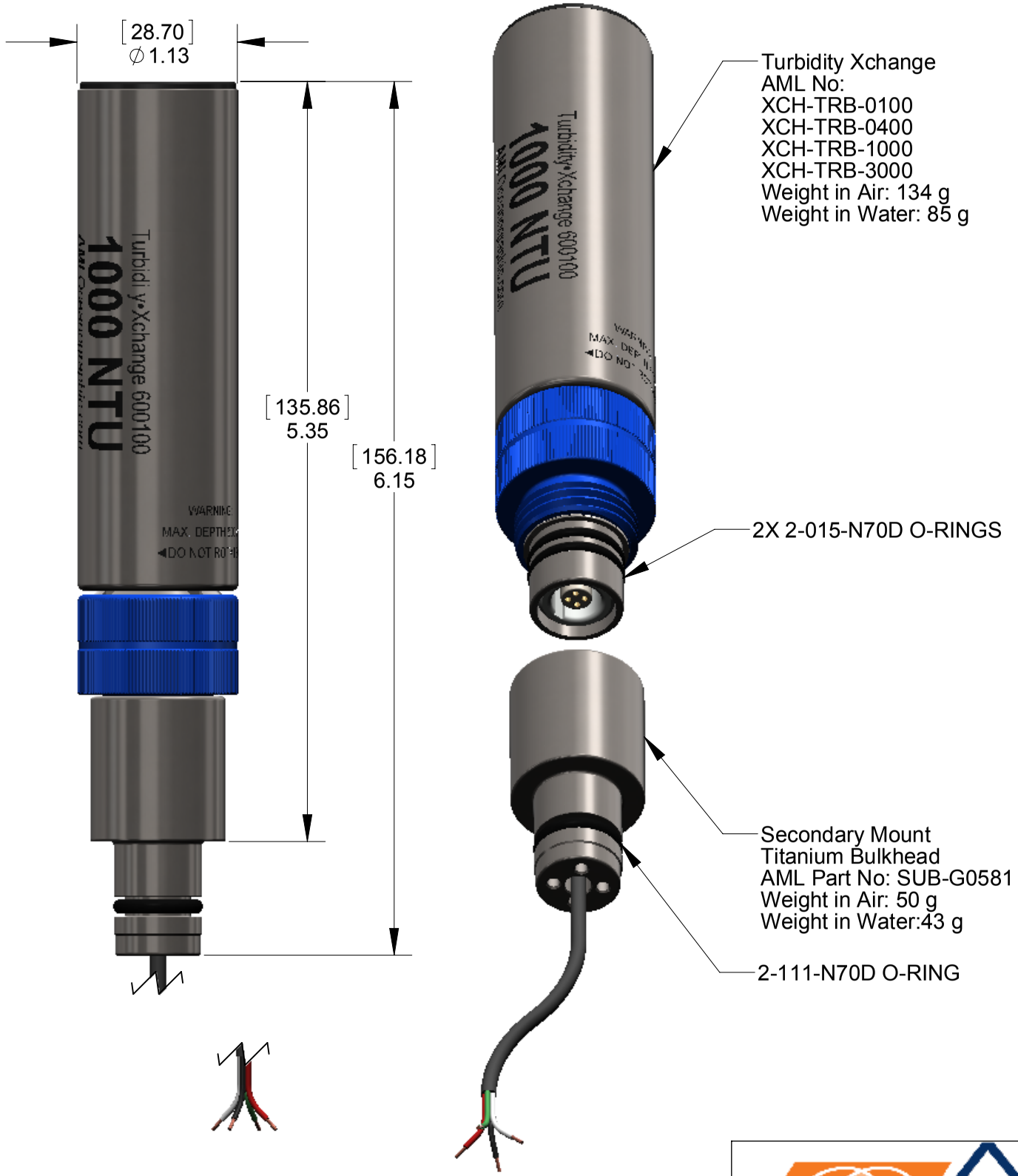
SURFACE FINISH: 63

TITLE:

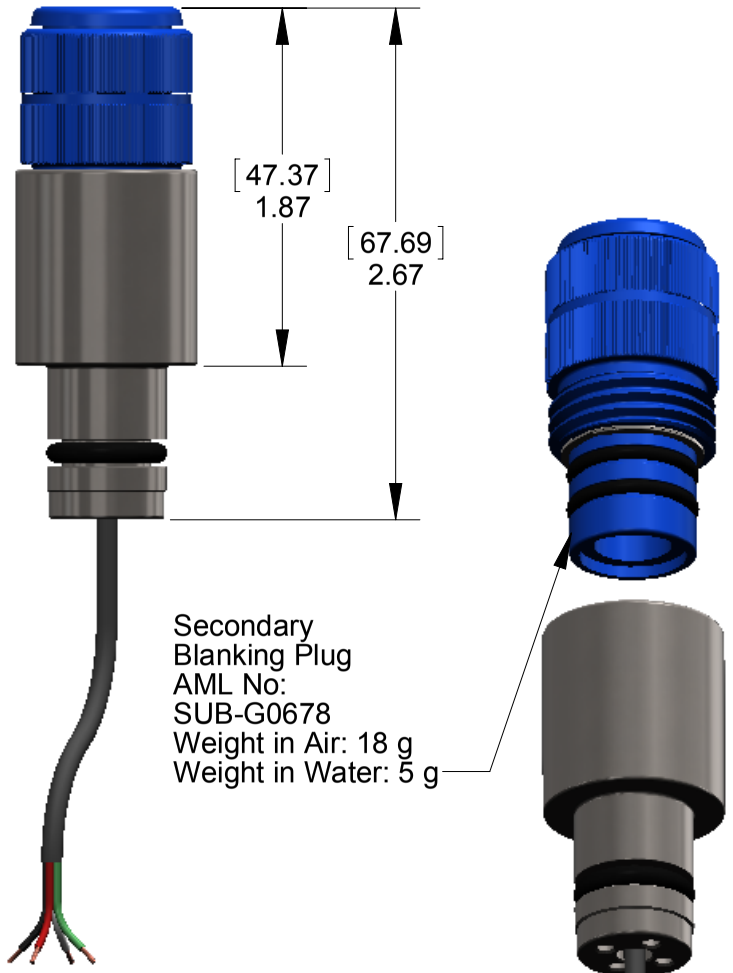
T Xchange OEM Specifications

DRAWN	DATE	DRAWING NO.: REV	AML NO.
I.L.	FEB 01/10	SNT-GA-03353-B	N/A
REVISION B.P.	*DATE* MAR 20/12	*MATERIAL:* N/A	
	SIZE B	*SLD FILE NO.:* SNT-GA-03353-B	*SHEET NO.* Sheet 3 of 3

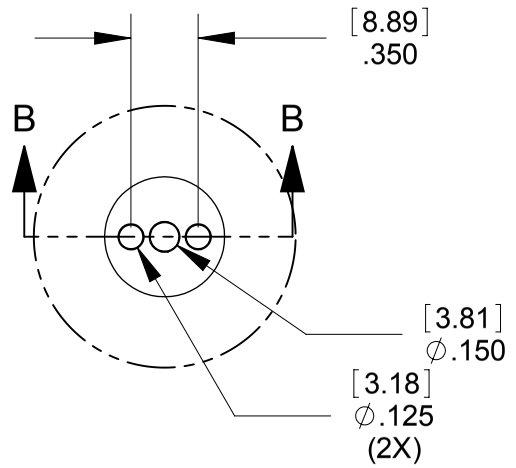
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF AML OCEANOGRAPHIC.
ANY REPRODUCTION IN PART OR WHOLE WITHOUT THE WRITTEN PERMISSION OF AML OCEANOGRAPHIC IS PROHIBITED

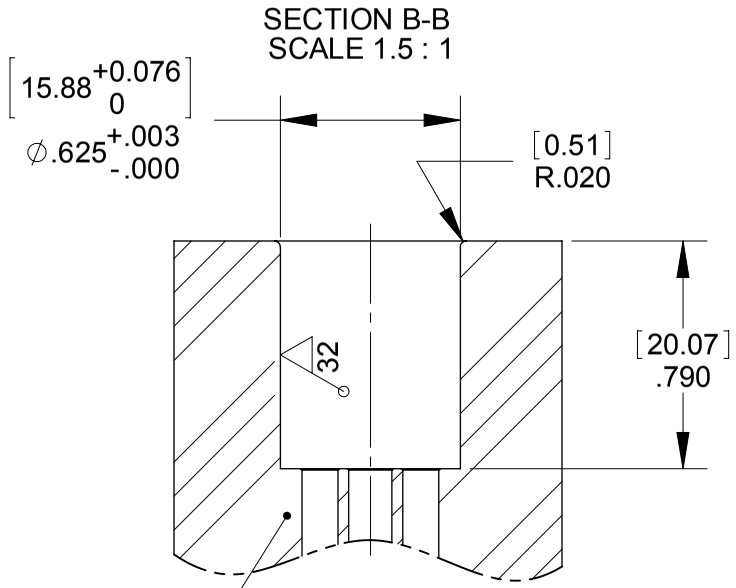


Turbidity Xchange Sensor Assembly



Blanking Plug Assembly





Mounting Requirements

AML OCEANOGRAPHIC
Xchange your old ideas
2071 Malaview Ave., Sidney B.C. Canada, V8L 5X6 Ph: (250) 656 0771 Fax: (250) 655 3655

THIS DRAWING CONFORMS TO ASME Y14.5-2009

DIMENSIONS AND TOLERANCES:
UNITS: INCHES [MM]
ANGLES: ± 1°
FRACTIONS: ± 1/32
HOLE SIZES: ± 0.005(0.13)
0.00: ± 0.015(0.38)
0.000: ± 0.005(0.13)

UNLESS OTHERWISE SPECIFIED:
ORIGINAL SCALE:1:1
HOLE DEPTHS GIVEN FOR FULL DIAMETER.
SURFACE FINISH: 63

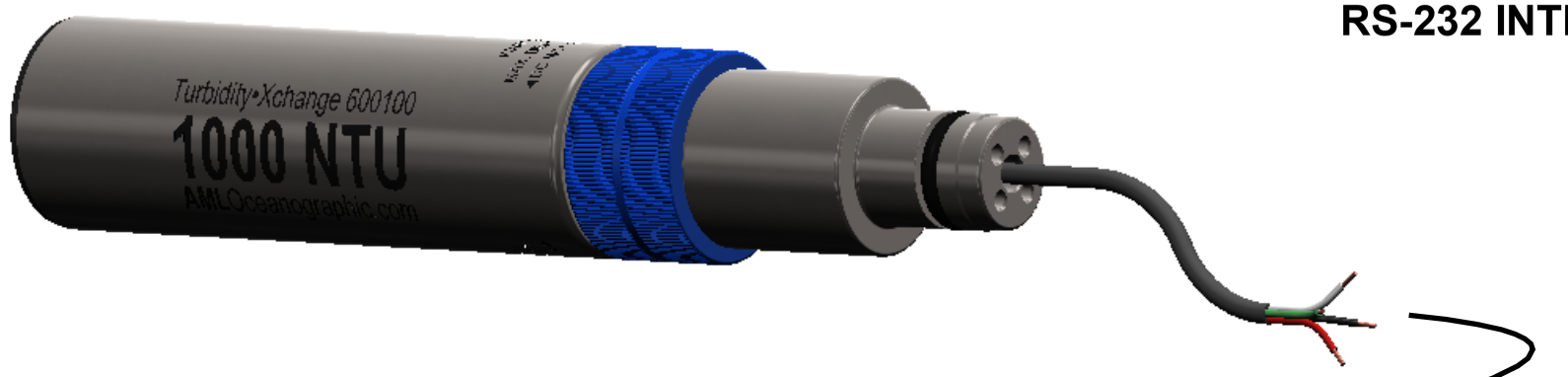
TITLE: Turbidity Xchange OEM Specifications

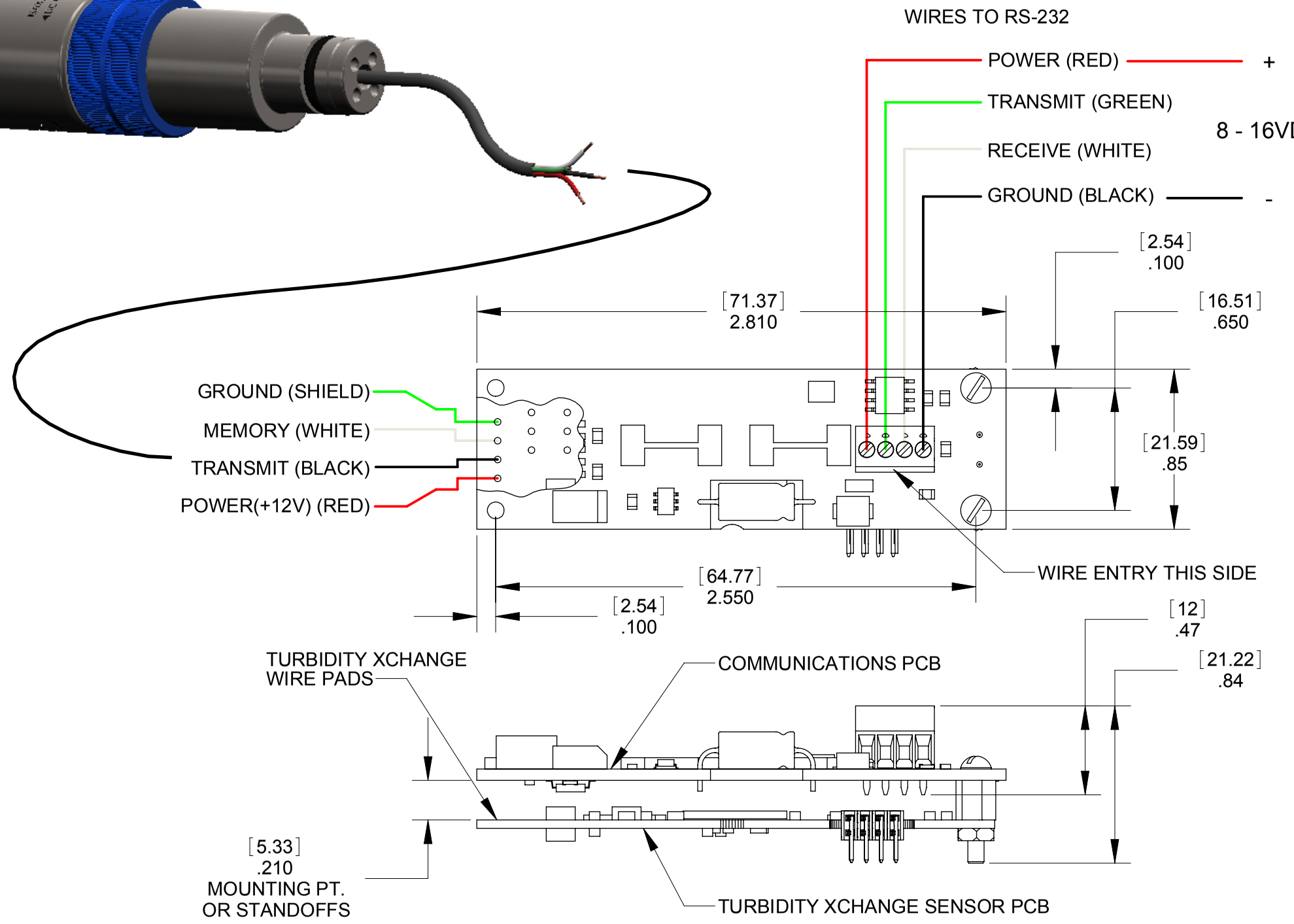
DRAWN	*DATE*	*DRAWING NO.:* / *REV*	*AML NO.*
I.L.	04 Dec 12	SNTU-GA-03600-A	UNSPECIFIED
REVIEWED	*DATE*	*MATERIAL:*	
		N/A	
	SIZE B	*SLD FILE NO.:* SNTU-GA-03601	*SHEET NO.* Sheet 1 of 3

REV	DESCRIPTION	BY	DATE
A	FIXED TTL WIRING DIAGRAM	DO	25NOV2013

THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF AML OCEANOGRAPHIC.
ANY REPRODUCTION IN PART OR WHOLE WITHOUT THE WRITTEN PERMISSION OF AML OCEANOGRAPHIC IS PROHIBITED

TURBIDITY XCHANGE ELECTRONICS OVERVIEW
RS-232 INTERFACE





AML OCEANOGRAPHIC
Xchange your old ideas
2071 Malaview Ave., Sidney B.C. Canada, V8L 5X6 Ph: (250) 656 0771 Fax: (250) 655 3655

THIS DRAWING CONFORMS TO ASME Y14.5-2009

DIMENSIONS AND TOLERANCES:
UNITS: INCHES [MM]
ANGLES: ± 1°
FRACTIONS: ± 1/32
HOLE SIZES: ± 0.005(0.13)
0.00: ± 0.015(0.38)
0.000: ± 0.005(0.13)

UNLESS OTHERWISE SPECIFIED:
ORIGINAL SCALE:1:1
HOLE DEPTHS GIVEN FOR FULL DIAMETER.
SURFACE FINISH: 63

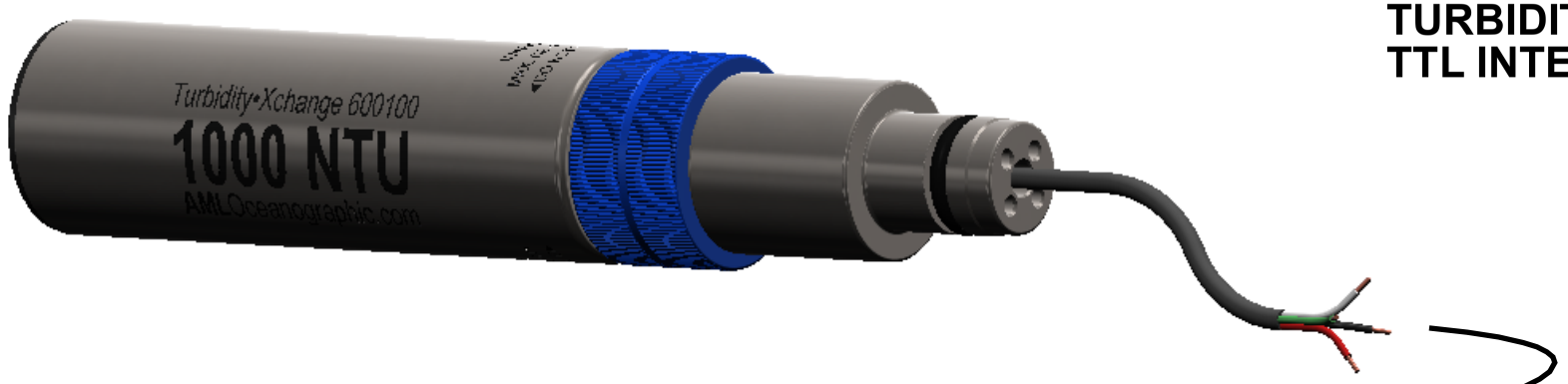
TITLE: Turbidity Xchange OEM Specifications

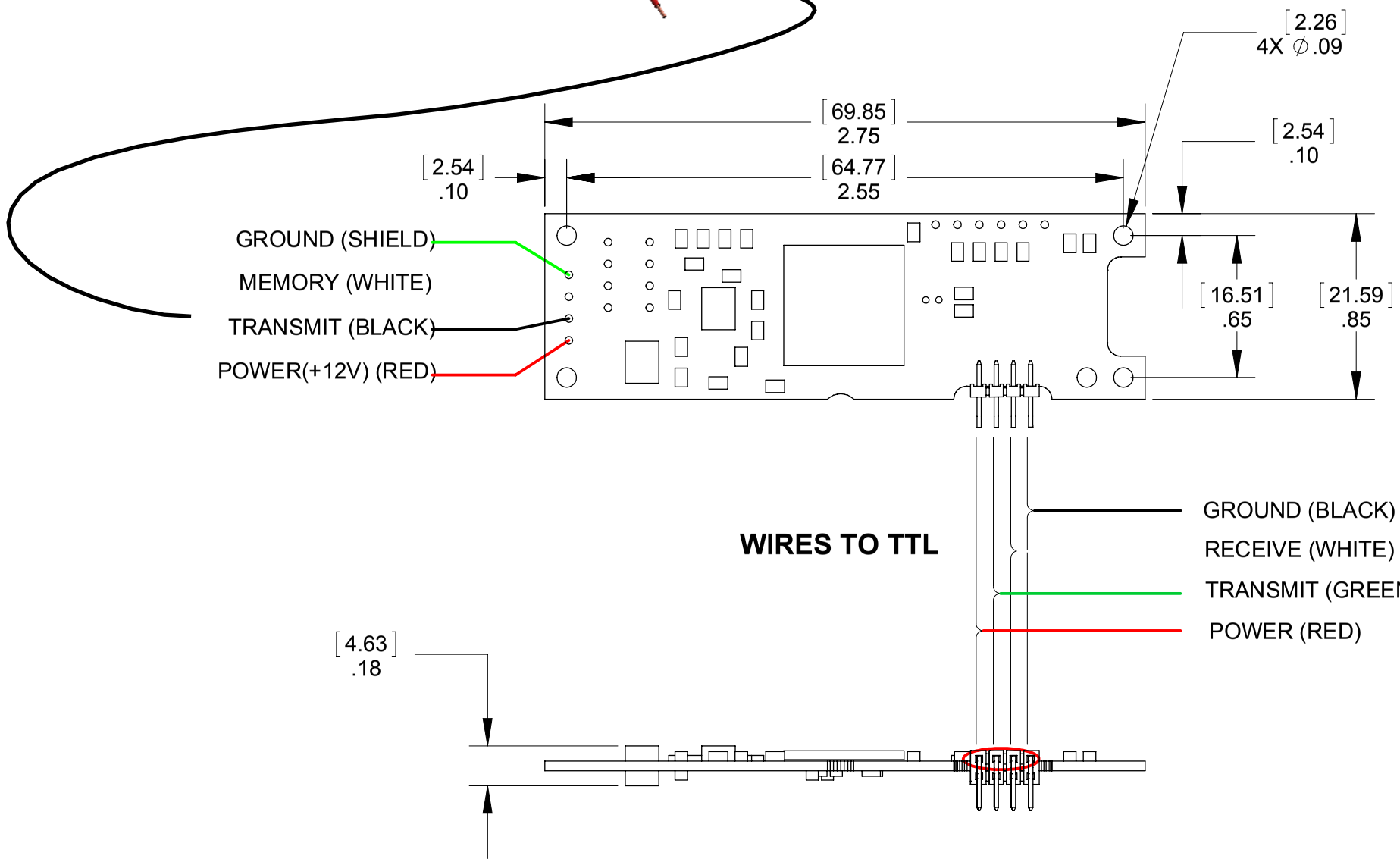
DRAWN	*DATE*	*DRAWING NO.:* / *REV*	*AML NO.*
I.L.	04 DEC 12	SNTU-GA-03600-A	UNSPECIFIED
REVISION	*DATE*	*MATERIAL:*	
		N/A	
	SIZE B	*SLD FILE NO.:* SNTU-GA-03601	*SHEET NO.* Sheet 2 of 3

REV	DESCRIPTION	BY	DATE
A	FIXED TTL WIRING DIAGRAM	DO	25NOV2013

THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF AML OCEANOGRAPHIC.
ANY REPRODUCTION IN PART OR WHOLE WITHOUT THE WRITTEN PERMISSION OF AML OCEANOGRAPHIC IS PROHIBITED

TURBIDITY XCHANGE ELECTRONICS OVERVIEW
TTL INTERFACE





AML OCEANOGRAPHIC
Xchange your old ideas
2071 Malaview Ave., Sidney B.C. Canada, V8L 5X6 Ph: (250) 656 0771 Fax: (250) 655 3655

THIS DRAWING CONFORMS TO ASME Y14.5-2009

DIMENSIONS AND TOLERANCES:

UNITS:	INCHES [MM]
ANGLES:	± 1°
FRACTIONS:	± 1/32
HOLE SIZES:	± 0.005(0.13)
0.00:	± 0.015(0.38)
0.000:	± 0.005(0.13)

UNLESS OTHERWISE SPECIFIED:

ORIGINAL SCALE:1:1

HOLE DEPTHS GIVEN FOR FULL DIAMETER.

SURFACE FINISH: 63

TITLE:

Turbidity Xchange OEM Specifications

DRAWN	*DATE*	*DRAWING NO.:* *REV*	*AML NO.*
I.L.	04 DEC 12	SNTU-GA-03600-A	UNSPECIFIED
REVIEWED	*DATE*	*MATERIAL:*	
		N/A	
	SIZE B	*SLD FILE NO.:* SNTU-GA-03601	*SHEET NO.* Sheet 3 of 3

REV	DESCRIPTION	BY	DATE
A	FIXED TTL WIRING DIAGRAM	DO	25NOV2013